1996-2000

Injury Prevention and Control Program
Hawaii State Department of Health

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Message from Director of Health

The Hawaii State Department of Health is pleased to present "Fatal Injuries in Hawaii: 1996-2000". This report contains the latest findings on the leading causes of injury mortality in Hawaii.

Injuries are a major public health problem in Hawaii. They are by far the leading cause of death among children and young adults, and the fourth leading cause of death among state residents of all ages. Over the 5-year period covered in this report, a total of 2,612 residents died from their injuries.

The information in this report is for health and safety professionals, policy makers, and for everyone interested in protecting and improving the health of the people of Hawaii. The report includes descriptions of the geography and magnitude of the problem, trends, and populations at higher risk, and provides insight into some of the circumstances of these injury fatalities. It is crucial that good data be available to guide prevention and policy efforts to reduce the risk of injury and injury mortality in Hawaii. This report is a first step. Please join with the Department of Health, state and local agencies, and community organizations in working toward a safer Hawaii.

Additional copies of this report and other injury prevention information may be obtained by calling the Department's Injury Prevention and Control Program at 808-586-5940.

Dr. Chiyome Leinaala Fukino, M.D.
Director of Health

Introduction

hat is the leading cause of death among Hawai‘i’s children and young adults? The answer is not infections, or cancer, but a public health problem too often underestimated: injuries. Injuries currently account for more deaths among Hawai‘i residents aged 1 to 40 years than all other causes combined. Injuries are also a leading cause of mortality in later ages, and for some outcomes (e.g. suicides) the highest risks are seen in the elderly.

The field of "injury" includes a diversity of events, ranging from motor vehicle crashes, to drownings, falls, and poisonings, and including assaults and suicides. Risk and protective factors have been identified for many injuries, just as for certain diseases. Injuries can often be prevented or the severity greatly reduced when these factors are addressed. For instance, we can greatly reduce the chance of a bad car crash (e.g. by observing posted speed limits), or the severity of the injury when a crash occurs (e.g. by utilizing seat belts). Besides these individual factors, risks for injury are also imposed by the environments in which people live, play and work.

This report describes fatal injuries in Hawai‘i over the 1996-2000 period, with an emphasis on the environmental and individual behavioral risk factors involved. This includes the geographic mapping of fatal injuries, and the analysis of the demography and behaviors of the victims. For many types of fatal injuries, this involved linking the basic information contained on death certificates to more detailed information from motor vehicle crash reports, autopsy records, and criminal investigations.

Although this report provides perhaps the most detailed summary of injury fatalities currently available in the state, it was not intended to be completely comprehensive. Readers who are interested in further information on a given area are encouraged to contact the Department of Health’s Injury Prevention and Control Program at 808-586-5940. This report is intended to bring attention to the injury problem, and help inform and direct efforts to reduce fatal injuries in Hawai‘i.

Summary

atal injuries are a major public health problem in Hawai‘i, constituting the 4th leading cause of death among state residents. Injuries are by far the leading cause of mortality among residents aged 1 to 40 years, accounting for more deaths in this age group than all other diseases combined. This report describes the magnitude of fatal injuries in the state, examines trends over time, and identifies geographic areas and segments of the population that are at increased risk of fatal injuries. This detailed report is a first step in bringing attention to the problem of fatal injuries, and providing information to design and direct injury prevention programs.

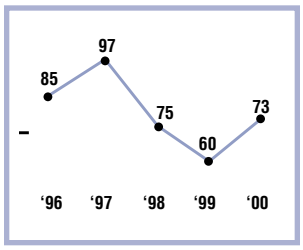
Although a leading cause of mortality, fatal injuries are relatively less common in Hawai‘i, compared to the rest of the United States. The age-adjusted 5-year rate for unintentional injuries is 21% lower in Hawai‘i, a statistically significant difference. The rate of homicide rate in Hawai‘i is less than half that for the rest of the U.S., while the suicide rates are comparable.

A total of 2,612 residents were killed by injuries over the 5-year period. Most (1,601, or 61%) were unintentional, 643 (25%) were suicides, and 181 (7%) were homicides. The intent could not be determined for 178 (7%) deaths. There were no significant trends in the annual totals of unintentional or intentional injuries.

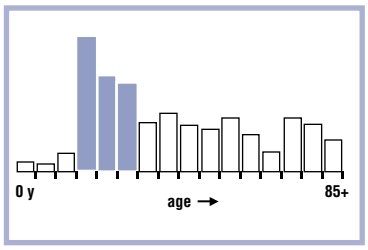
Unintentional injuries, by main categories:

Motor vehicle crashes, occupants (excluding motorcyclists)

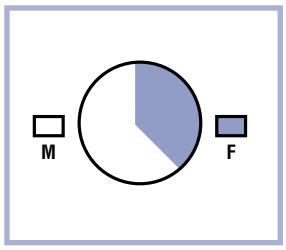
This was the only category to show a significant decrease in trend over the 5-year period. The peak age was 15 to 29 years (44% of the total). Overall, two-thirds of the victims were males. Rates were significantly higher among Neighbor Island residents, compared to O‘ahu residents. Most notable were the rates among residents of Hawai‘i County, which were 5 times higher than those for residents of O‘ahu.



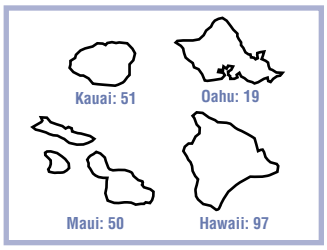
Trend: significantly decreasing.
Total: 390, Average: 78/year



Age groups:
15-29y = 44%



Gender:
64% M, 36% F

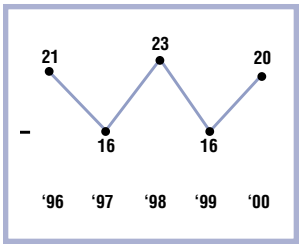


Five-year County rates (/100,000):
Hawaii

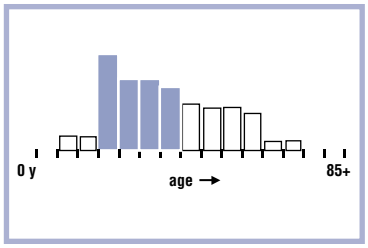
Fatal crashes were most common in the summer months of June through August (33% of all crashes), on weekends (35% of crashes) and at night, particularly the midnight to 2:00 a.m. period (21% of crashes). Almost half (45%) of the drivers killed in crashes had used alcohol, and more than one-third (37%) were legally drunk. At least half of all fatal crashes in each year involved alcohol (annual range: 50% to 65%). Drinking was much more common among drivers killed on weekends (69%) and at night (63%). Most of the victims (54%) had not been wearing a seat belt at the time of the crash. Restraint use was lowest among passengers (30%), particularly among back seat passengers (7%). About a third (34%) of the crashes involved speeding, which was more common in crashes on O‘ahu (46%). There were significant relationships between alcohol use, restraint use and speeding. Detailed maps showing the location of individual crashes are available.

Motor vehicle crashes, motorcyclists

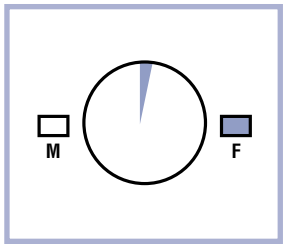
Most of the fatally injured motorcyclists were young adult males; nearly two-thirds (61%) of the 96 victims were males aged 20 to 39 years. The highest rates were computed for Hawai‘i County.



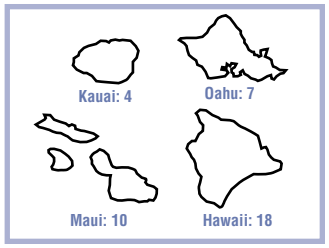
Trend: no trend.
Total: 96, Average: 19/year



Age groups:
20-39y = 64%



Gender:
96% M, 4% F

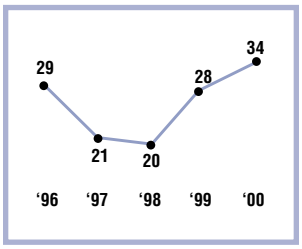


Five-year County rates (/100,000):
Hawaii

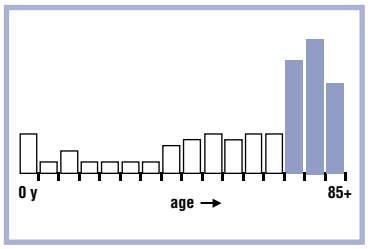
The North Kona area of Hawai‘i had the highest district fatality total, with 8 deaths. Other high-risk areas included the Hilo district, Wailuku district on Maui, and Kailua and Kalihi-Pālama on O‘ahu. Nearly half (46%) of the drivers tested positive for alcohol, and almost one-third (32%) were legally drunk. There was also an increasing trend in the proportion of drivers who used alcohol over the 5-year period. Alcohol use was particularly common (65%) among drivers who crashed in the nighttime hours of 7:00 p.m. to 5:00 a.m. Only a minority (20%) of the drivers had been wearing helmets at the time of the crash. About 42% of the crashes did not involve another vehicle but were due to loss of control of the motorcycle. Speeding contributed to 42% of the crashes.

Motor vehicle crashes, pedestrians

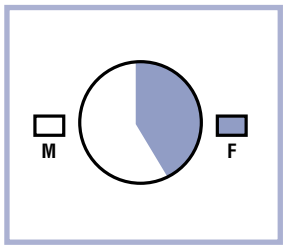
The annual rate of pedestrian fatalities increased significantly over the 4-year period of 1997 to 2000. More than half (55%) of the victims were aged 65 years or older, and the rate rose exponentially over the age groups of 65 to 85-plus years.



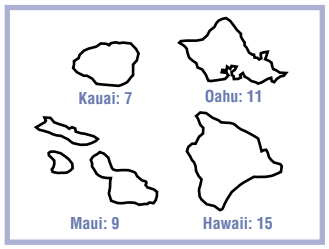
Trend: somewhat increasing.
Total: 132, Average: 26/year



Age groups:
65+y = 55%



Gender:
59% M, 41% F

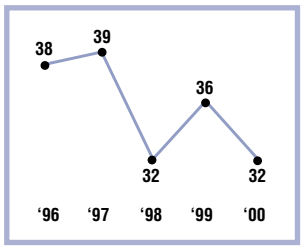


Five-year County rates (/100,000):
Hawaii

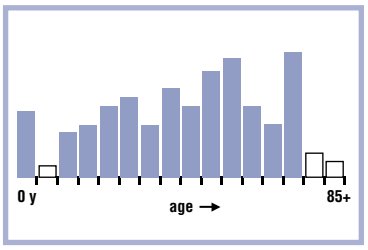
There were 2 peak times for pedestrian fatalities: 6:00 a.m. to 8:00 a.m. (33% of the deaths), and 2:00 p.m. to 7:00 p.m. (30%). Among victims aged 15 years or older, 16% had been drinking at the time of the crash, and 10% were intoxicated. Alcohol use was much more common among victims hit between 7:00 p.m. and 5:00 a.m. (42%), compared to those hit during daylight hours (6%). Only 10% of the crashes were thought to be related to speeding among the drivers. Mapping of crash sites on O‘ahu shows that Wai‘anae and Kalihi-Pālama had the highest numbers of fatalities.

Drownings (residents only)

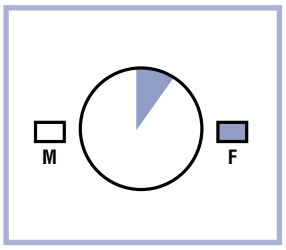
There was no clear trend in the annual number of drownings, although the two lowest totals occurred in 1998 and 2000. The ages of the victims were very broadly distributed, with no obvious high-risk range. Almost all (88%) were males. Drowning rates were roughly twice as high for the Neighbor Islands, compared to O‘ahu. Kaua‘i and Hawai‘i had particularly high rates.



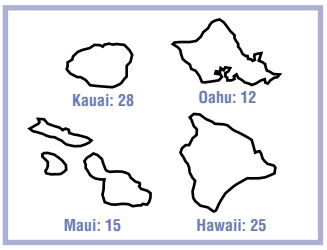
Trend: no trend.
Total: 177, Average: 34/year



Age groups:
all ages, except 5-9y and 75+y



Gender:
88% M, 12% F

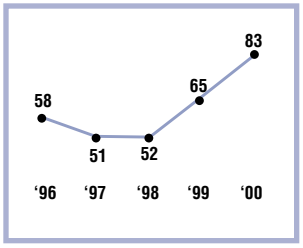


Five-year County rates (/100,000):
Kauai, Hawaii

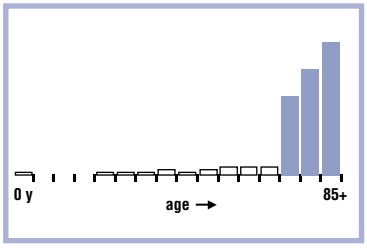
About three-quarters (77%) of the victims drowned in the ocean or saltwater environments. There were also 16 drownings (9%) in freshwater environments, including 3 drownings in the Wailuku River near Hilo. Fourteen (8%) of the drownings were in swimming pools, including 13 on the island of O‘ahu. Most (64%) of the victims who drowned in pools were 5 years old or younger, while almost all (98%) who drowned in the ocean were 14 years or older. Unintentional immersions led to 26% of the ocean drownings. The most common activities were swimming (18%), free diving (13%), scuba diving (7%), and surfing/body boarding (7%). A number of mitigating or extrinsic factors were identified from the autopsy records of victims who drowned in the ocean off O‘ahu: circulatory diseases, most commonly heart disease, caused or contributed to 18% of these drownings. Ten percent of the O‘ahu drownings were alcohol related, 10% were drug related, and 4% were related to seizure disorders.

Falls

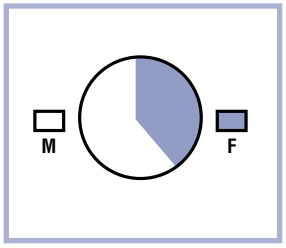
There was a significantly increasing trend in the rate of fatal injuries due to falls. Most (78%) of the victims were aged 65 years or older, and the risk of falls increased dramatically with age from 65 years onward. There were few differences in county-specific rate estimates.



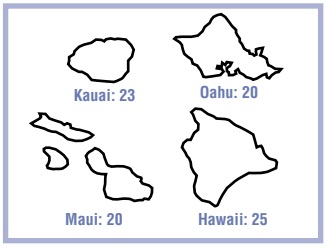
Trend: significantly increasing.
Total: 309, Average: 62/year



Age groups:
65+y=78%



Gender:
63% M, 37% F



Five-year County rates* (/100,000):
no significant differences

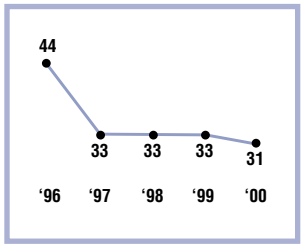
**Rates among victims aged 65 years and older. Kauai and Maui estimates are unreliable, since they are based on small numbers.*

The causes of roughly half (49%) of these fatal falls were unknown or not listed on the death certificate. For the remainder, the most common causes were slips/trips, falls from buildings, stairs, cliffs and ladders. Most (71%) of the falls occurred during daylight hours.

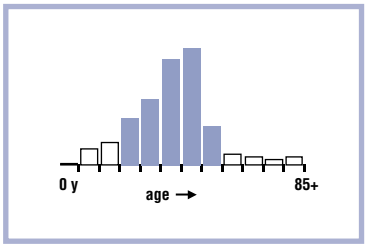
Drugs caused almost all (94%) of the poisonings,...

Poisonings

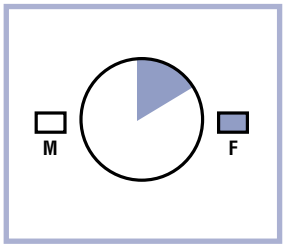
Almost all (88%) of the victims killed by poisonings were 25 to 54 years of age, and most (82%) were males. Poisoning rates were highest in Hawai'i County. Drugs caused almost all (94%) of the poisonings, most commonly the narcotics heroin and cocaine.



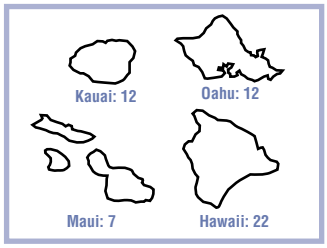
Trend: no trend.
Total: 173, Average: 35/year



Age groups:
25-54y = 88%



Gender:
82% M, 18% F

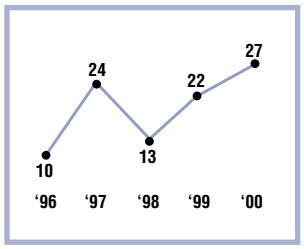


Five-year County rates* (/100,000):
Hawaii

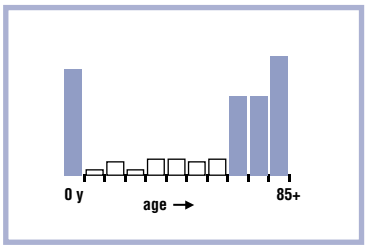
**Rates among victims aged 25-54 year. Kauai and Maui estimates are unreliable, since they are based on small numbers.*

Suffocations

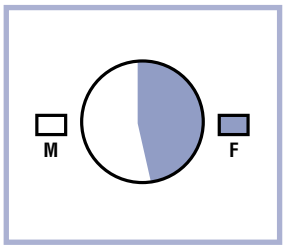
Deaths from suffocation increased significantly over the 5-year period, most consistently among victims aged 65 years and older. The other high-risk age group was infants and 1 year-olds, all but one of whom suffocated in their beds or cradles. Gender was almost equally distributed, in contrast to most injury categories. About a quarter (26%) of the suffocations were due to the inhalation of foods, and most (72%) of these victims were 70 years or older. The aspiration of non-food items caused 44% of the suffocations, and 93% of these victims were 60 years or older.



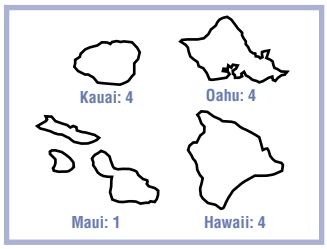
Trend: somewhat increasing.
Total: 96, Average: 16/year



Age groups:
0-1y=23%, 65+y = 58%



Gender:
53% M, 47% F

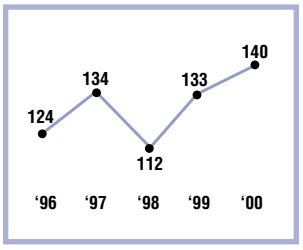


Five-year County rates* (/100,000):
no significant differences

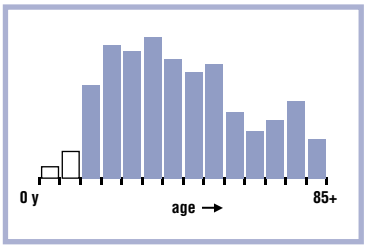
**Rates among victims aged 65 year and older. Kauai, Maui and Hawaii estimates are unreliable, since they are based on small numbers.*

Suicides

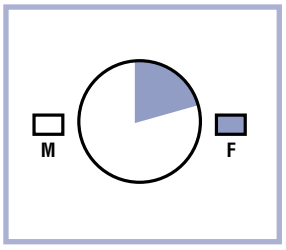
Almost all (95%) of the suicide victims were 20 years or older, and about two-thirds (64%) were between 25 and 54 years of age. Male victims outnumbered females by approximately 3-to-1. Rates among O'ahu residents were 28% lower, compared to Neighbor Island residents, where Maui and Hawai'i residents had the highest rates.



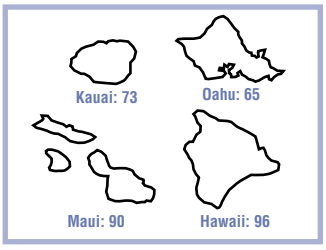
Trend: no trend.
Ave: 129/year, range: 112-140



Age groups:
Ages over 19y = 95%



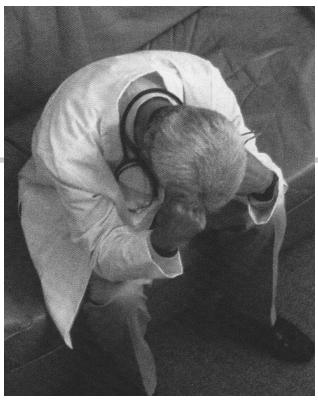
Gender:
77% M, 23% F



Five-year County rates* (/100,000):
Maui, Hawaii

**Rates among victims aged 20 years and older.*

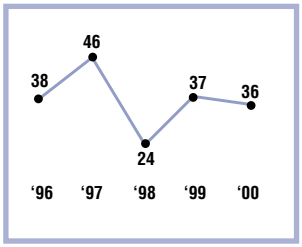
The most common mechanism was by hanging or suffocation (45% of the suicides), followed by firearm use (24%). At least one negative life event was documented in the autopsy records of most (64%) of the victims who died on O'ahu in the 1997-1999 period, most commonly serious illness (28%) or the end of a relationship (27%). About one-third (31%) of the victims tested positive for alcohol at autopsy, and heavy alcohol use was found to be more common among younger victims. Illicit drugs were detected among 26% of the victims, where methamphetamine (14%), marijuana (8%), and cocaine (6%) were the most common substances. About two-thirds (62%) of the victims had a documented history of mental illness, and about one-fifth (22%) were known to have made previous suicide attempts.



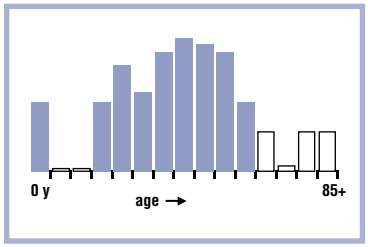
At least one negative life event was documented in the autopsy records of most (64%) of the suicide victims.

Homicides

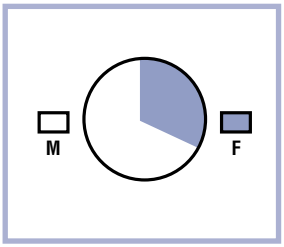
There was a broad age range among the homicide victims, but 75% were between 20 and 54 years of age. The majority (69%) were males. Rates were highest in Hawai‘i County.



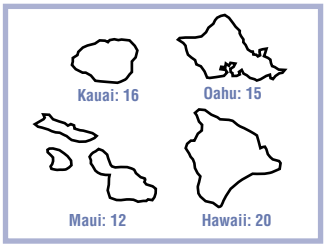
Trend: no trend.
Ave: 36/year, range: 24-46



Age groups:
20-54y = 75%



Gender:
69% M, 31% F



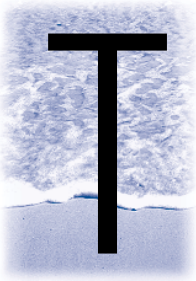
Five-year County rates* (/100,000):
no significant differences

**Kauai and Maui estimates are unreliable, since they are based on small numbers.*

The most common method was the use of firearms (38%), followed by strongarm (27%) and stabbing (22%). The Puna district on Hawai‘i had 11 homicides, noteworthy for the small population there. Maps of incident locations are available. High-risk areas on O‘ahu included Wai‘anae, Kalihi-Pālama, Waikīkī, and Waipahu. According to a supplemental data source (Uniform Crime Reports), two-thirds (67%) of the homicide victims knew their assailant, and only a minority (18%) were killed by strangers. Female victims were most likely to be killed by their intimate partner (40%), while males were most likely to be killed by acquaintances (50%).

...most homicide victims (67%) knew their assailant, and only a minority (18%) were killed by strangers...

Data sources & methodology



The primary source of injury mortality data in Hawai‘i is the Health Integrated Data System (HIDS) database of the Hawai‘i Department of Health.[1] The raw data was downloaded and in some cases re-coded to match the CDC recommended framework of E-code groupings[2], or other data groupings. Supplemental data was also used for certain injury categories. Data from the Fatal Analysis Reporting System[3] (FARS) of the National Highway Traffic Safety Administration (NHTSA) was linked to HIDS data for deaths involving motor vehicles. Records from the Honolulu County Medical Examiner's (ME) office were reviewed for details on O‘ahu drownings during the 1996-2000 period, and for suicides that occurred between 1997 and 1999. For some types of injuries, hard copies of the death certificates were manually reviewed to extract information not normally entered in the HIDS database. These reviews were done for deaths due to suffocations, fires and burns, bicycle crashes, and drownings. Supplemental data on homicides was abstracted from the Uniform Crime Reports (UCR) maintained by the Crime Prevention and Justice Assistance Division of the State of Hawai‘i Attorney General.

Fatal injuries are described within the main intent categories of unintentional injuries (drownings, car crashes, etc.) and intentional injuries (homicides and suicides), as defined by the CDC recommended framework.[2] Unintentional injuries are described both as a total and separately within the 9 main mechanisms: motor vehicle crashes involving occupants, motorcyclists, pedestrians, and bicyclists, and falls, drownings, poisonings, fires, and suffocations. The intent of the fatal injury could not be determined for some injuries, and these are described as a total in one of the final chapters.

One section of this document compares general injury mortality in Hawai‘i versus that in the rest of the United States. The national data comes from the WISQARS[4] (Web-based Injury Statistics Query and Reporting System) online database, accessed at the web site for the Centers for Disease Control and Prevention. The fatality totals from this database were adjusted for the portion of deaths among Hawai‘i residents.

Injury rates were computed and compared

The calculation of injury mortality rates necessitates the definition of "at risk" populations for the denominator. For the section comparing U.S. and Hawai‘i fatality rates, the denominator was the average annual resident population over the 1996-2000 period. This data was obtained from the web site for the U.S. Census Bureau.[5] Other analyses compared rate estimates of the 4 counties within Hawai‘i, and these calculations relied on census estimates from the Department of Business, Economic Development and Tourism (DBEDT) of the State of Hawai‘i.[6] The average population over the 1996-2000 period was used for these county-specific rate estimates. DBEDT was also the source of estimated counts of visitors to Hawai‘i over the 5-year period. For the chapter on fatal injuries among non-residents, this information was compiled into 2 main categories: U.S. visitors from outside of Hawai‘i, and visitors from other countries.

This report includes mostly information on injury-related deaths among residents of Hawai‘i. There is a separate section of the document which examines non-resident deaths in more detail.

The county in which the injury occurred is not directly recorded in the HIDS database. However, if the county of death for a victim matched the county of residence, then it was assumed the injury occurred in that county. This was the case for almost all (95%) of the fatalities. For the remaining 5% of the cases, the county of injury was determined after review of an open-text field which gave the specific location where the injury occurred. Since this field did not contain sufficient information in 8 cases, the county of residence was assigned as the county of injury.

Age-adjustment was by the direct method, using the U.S. 2000 standard population.[7] Sixteen age groups were used for standardization across all ages, although certain calculations were restricted to more narrow age ranges.

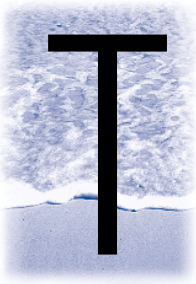
Injury rates were computed and compared for 8 ethnicities: Black, Caucasian, Chinese, Filipino, Hawaiian, Japanese, Korean and Samoan. These 8 groups comprised 92% of the total number of residents killed by injuries. Ethnicity was assigned using the first-listed ethnicity on the death certificate. Overall, for about three-fourths (73%) of the victims of these 8 main groups, only one ethnicity was listed on the death certificate, but that proportion was notably lower among Blacks (67%), and especially Hawaiians (13%). Ethnic-specific rates were computed using resident population estimates from the 2000 U.S. Census.[5] The "alone or in any combination" enumerations were used for all 8 ethnicities, given the ethnic admixture described above. The results of these analyses were not substantially different when the "alone" enumerations were used, except for Hawaiians. Since there were too few deaths within some of the ethnicities to adjust the rates for age distribution, comparisons were made using "crude" or unadjusted rate estimates. For these reasons, the results from these ethnic-specific comparisons should be interpreted with caution.

This report includes mostly information on injury-related deaths among residents of Hawai‘i. This is consistent with national reporting conventions of injury mortality and allows for the comparison of fatal injury rates in Hawai‘i with rates for the remainder of the country. Since age and county-specific population estimates are also available only for residents, the inclusion of deaths among non-residents would result in a slight over-estimation of fatality rates. There were 317 total injury-related deaths of non-residents over the 5-year period, or about 11% of the total. As this is a considerable number of deaths, there is a separate section of the document which examines these deaths in more detail. In general, however, exclusion of deaths among non-residents does not significantly impact the description of the remaining fatal injuries in this document. Residents represented at least 92% of the victims in the major injury categories, with the notable exception of deaths due to drowning, 40% of which occurred among non-residents. There is therefore a separate section on drowning which includes information on both resident and non-resident victims.

Also excluded from this report were 41 deaths that were due to "adverse effects" of medical treatment; injuries resulting from surgical or medical care, or adverse reactions to drugs or medicinal substances. These iatrogenic events generally occur outside of the usual public health context of injury prevention.

Deaths from the 1996 through 1998 period were coded under the ICD-9 system, while deaths for 1999 through 2000 were coded under the ICD-10 system. The assessment of trends across the 1996 to 2000 period can therefore be complicated by coding changes between the two ICD systems.[8] For most types of fatal injuries, however, less than 3% of the deaths are differentially classified when the two coding systems are compared. That magnitude is unlikely to significantly influence the statistical testing of trends in Hawaii, given the relatively small number of deaths in the state. The exception to high comparability between the two coding systems is motor vehicle crashes, which are more likely to be classified as “other land transport accidents” in ICD-10 if there is insufficient information contained on the death certificate. However, this issue is largely moot in the Hawaii data, since motor vehicle death certificate information is merged with FARS, which results in a more definite classification.

Overview of all injury deaths among Hawai‘i residents:



here were 2,612 injury-related deaths among the residents of Hawai‘i over the 5-year period. This total represented about 6.6% of the 39,792 total number of deaths that occurred among Hawai‘i residents during this period. Unintentional injuries were the fourth leading cause of death for all residents, and the leading cause of death for those aged 1 to 39 years (Figure 1). In fact, injuries accounted for more deaths in this age group than all other causes combined. Suicides and homicides were prominent categories of overall mortality among 10 to 39 year-olds.

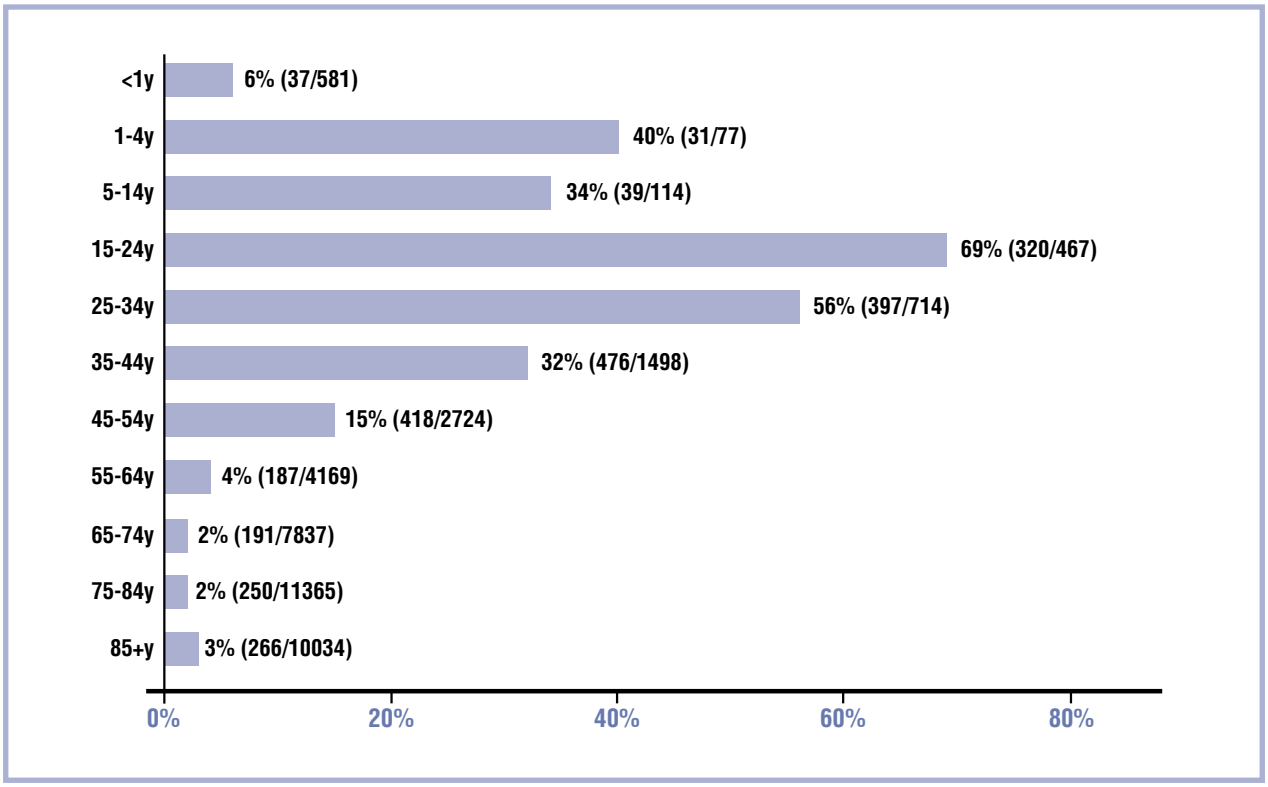
Figure 1. Five leading causes of death among Hawai‘i residents, by age group, 1996-2000.

Rank	Infants	1-9y	10-19y	20-29y	30-39y	40-64y	65+ y	all ages
1	Perinatal conditions 298	unintent. injuries 40	unintent. injuries 107	unintent. injuries 211	unintent. injuries 196	cancer 2,505	heart diseases 9,688	heart diseases 12,100
2	congenital anomalies 103	cancer 20	suicide 33	suicide 124	cancer 177	heart diseases 2,166	cancer 6,579	cancer 9,359
3	unintent. injuries 22	congenital anomalies 11	cancer 27	cancer 48	heart diseases 167	CVD 432	CVD 2,893	CVD 3,387
4	influenza/ pneumonia 11	heart diseases 7	heart diseases 17	heart diseases 44	suicide 151	unintent. injuries 440	influenza/ pneumonia 1,276	unintent. injuries 1,601
5	injuries of unk. intent 8	influenza/ pneumonia 6	homicide 13	homicide 32	HIV infection 72	diabetes mellitus 275	COPD* 1,114	influenza/ pneumonia 1,415

**COPD = chronic obstructive pulmonary disease*

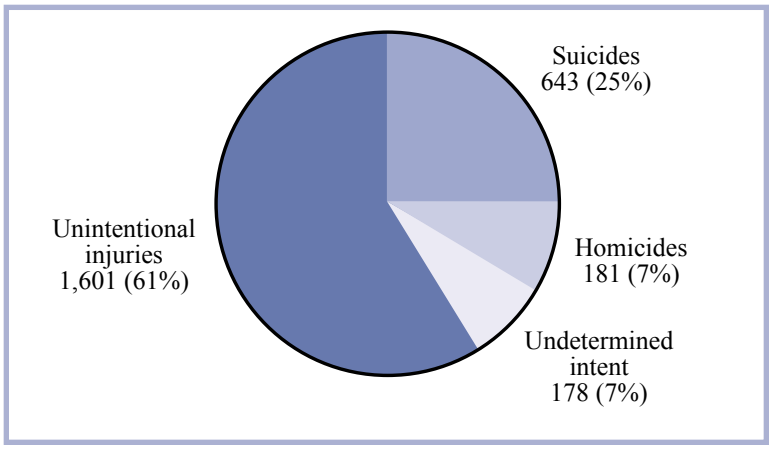
The importance of injuries as a cause of death among children and young adults is shown in Figure 2, below. Injuries accounted for more than one-third of all deaths among children aged 1 to 14 years, and almost two-thirds of those among decedents aged 15 to 24 years. Injuries also caused the majority of deaths among 25-34 year-olds, and one-third of those among 35-44 year-olds. Overall, 44% of all deaths among residents aged 1 to 44 years were injury related. Injuries were the leading cause of years of potential life lost before the age of 65 among state residents. Over the 5-year period, a total of 54,396 person years of life were lost before the age of 65 due to fatal injuries. In comparison, 35,996 years of life before age 65 were lost due to cancer, and 30,101 due to heart disease.

Figure 2. Injury deaths as a percent of all deaths among Hawai'i residents, by age group, 1996-2000.



The majority (61%) of the 2,612 injury-related deaths were classified as unintentional (Figure 3). Suicides constituted 25% of the total, homicides 7%, and injuries of undetermined intent the remaining 7%. Each of these four categories of fatal injuries will be discussed in more detail in the following sections.

Figure 3. Fatal injuries among residents of Hawai'i, by intent, 1996-2000.

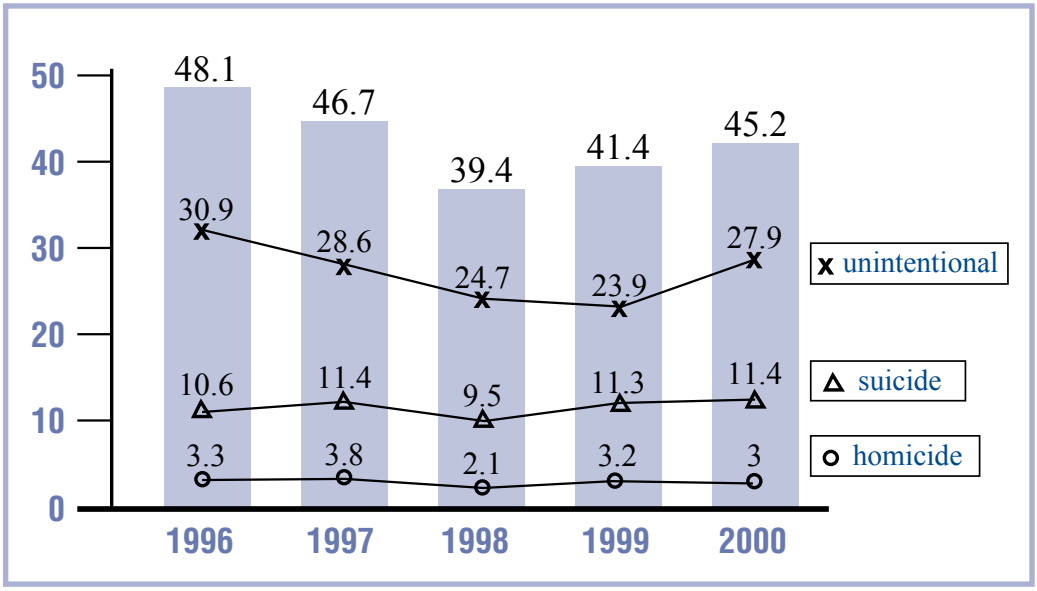


**Not shown are 9 deaths that were due to legal intervention.*

Annual rates of fatal injuries are shown by the main intent categories in Figure 4. There were no statistically significant trends for any of the intent categories over the 5-year period. The rate for fatal unintentional injuries decreased significantly over the 1996-1999 period, but increased in 2000. (This pattern was largely paralleled for the rates of all types of fatal injuries, since most injuries are unintentional.) The trends for suicides and homicides were relatively flat.

Figure 4. Age-adjusted annual rates (/100,000) of fatal injuries among Hawai'i residents, by intent, 1996-2000.

(Rates for all types of injuries are indicated by bars, including injuries of undetermined intent.)



Overall, 44% of all deaths among residents aged 1 to 44 years were injury related. Injuries were the leading cause of years of potential life lost before the age of 65 among state residents.

Figure 5 breaks down the causes of fatal injuries into more specific groups, and shows that the leading causes vary by the age group of the victims. Suffocation was a leading cause of injury mortality in the very youngest and oldest age groups, but not in the intervening ages. Deaths among car occupants were the leading cause of injury mortality among 1 to 24 year olds, but this category decreased in rank across the succeeding age groups. Suicide was the leading cause of injury mortality among victims aged 25 years and older, although falls were a far more frequent cause in the two oldest age groups. Poisonings were common only among the 25 to 64 year-old victims, but homicides and drownings were among the leading causes of fatal injuries for nearly all but the oldest age group. The associations between age and other demographic variables will be explored more fully for each category in later sections of this report.

Figure 5. Five leading causes of fatal injuries among Hawai'i residents, by age group, 1996-2000.

Rank	Infants (37 total)	1-14y (70)	15-24y (320)	25-34y (397)	35-44y (476)	45-64y (605)	65-79y (319)	75+y (389)	
1	suffocation 16	drowning 17	mvc*-occupant 129	suicide 148	suicide 145	suicide 175	falls 83	falls 159	suicide 643
2	injuries of unk. intent 8[1]	mvc*-occupant 13	suicide 77	mvc*-occupant 68	poisoning 119[2]	poisoning 119[3]	suicide 56	suffocation 40	mvc*-occupant 390
3	homicide 7	mvc*-pedestrian 12	homicide 30	homicide 35	mvc*-occupant 54	mvc*-occupant 64	mvc*-pedestrian 43	suicide 37	falls 309
4	drowning 2	fires 7	mvc*-motorcycle 22	mvc*-motorcycle 28	homicide 47	drowning 57	mvc*-occupant 40	mvc*-pedestrian 30	homicide 181
5	falls 2	homicide 6	drowning 21	poisoning 28	drowning 28	homicide 42	drowning 24	mvc*-occupant 21	drowning 177

**mvc = motor vehicle crash*

1Includes 4 deaths due to falls, and 4 due to suffocation.

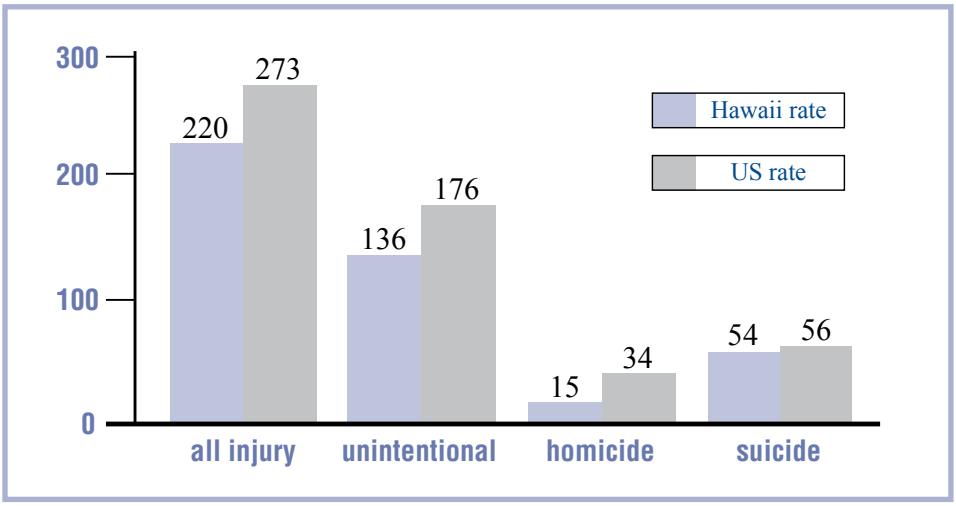
2Includes 52 poisonings for which the intent could not be determined.

3Includes 53 poisonings for which the intent could not be determined.

Comparisons with the rest of the United States

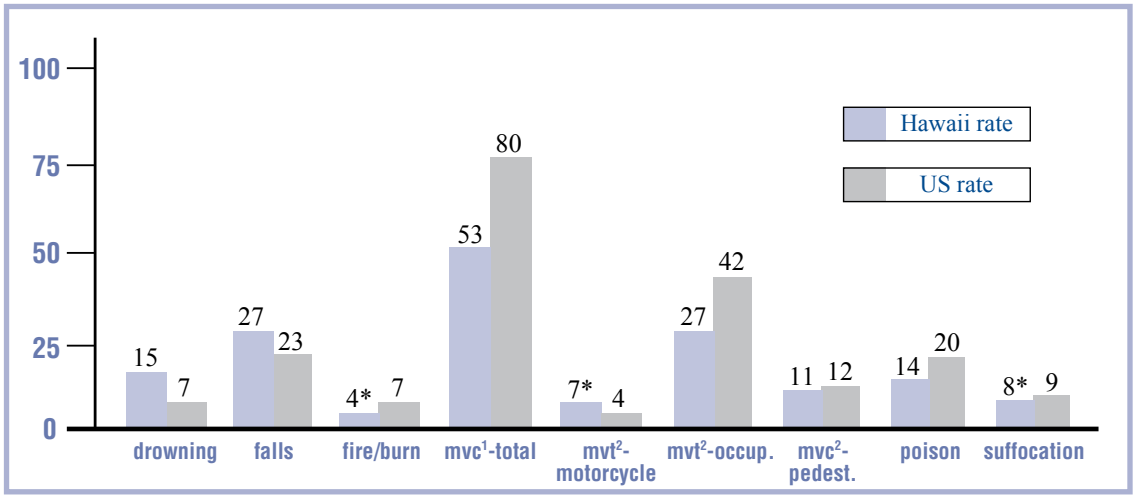
The rate of fatal injuries in Hawai‘i was significantly lower (by 19%) than the rate for the rest of the U.S. Figure 6 shows that this discrepancy was due to the lower frequency of unintentional injury deaths and homicides in Hawai‘i, as the suicide rates were similar between Hawai‘i and the rest of the U.S. Fatal unintentional injury rates were 23% lower in Hawai‘i, and homicide rates in Hawai‘i are less than half those for the rest of the U.S.

Figure 6. Age-standardized 5-year rates (/100,000) of fatal injuries among Hawai‘i and (non-Hawai‘i) U.S. residents, by intent, 1996-2000.



Fatalities among car occupants were 36% lower among Hawai‘i residents, compared to other U.S. residents (Figure 7). This was the main reason for the low rate of fatal unintentional injuries in Hawai‘i, compared to the rest of the U.S. Fatal motorcycle crashes were more common among Hawai‘i residents, but this is only a small part of the deaths due to motor vehicle crashes. Drowning was the only category for which the rate in Hawai‘i was appreciably higher than that for the rest of the U.S. Rates of fatal falls, pedestrian crashes, and suffocations were about the same between Hawai‘i and the remaining U.S. residents, while rates of deaths from fires and poisonings were lower among Hawai‘i residents.

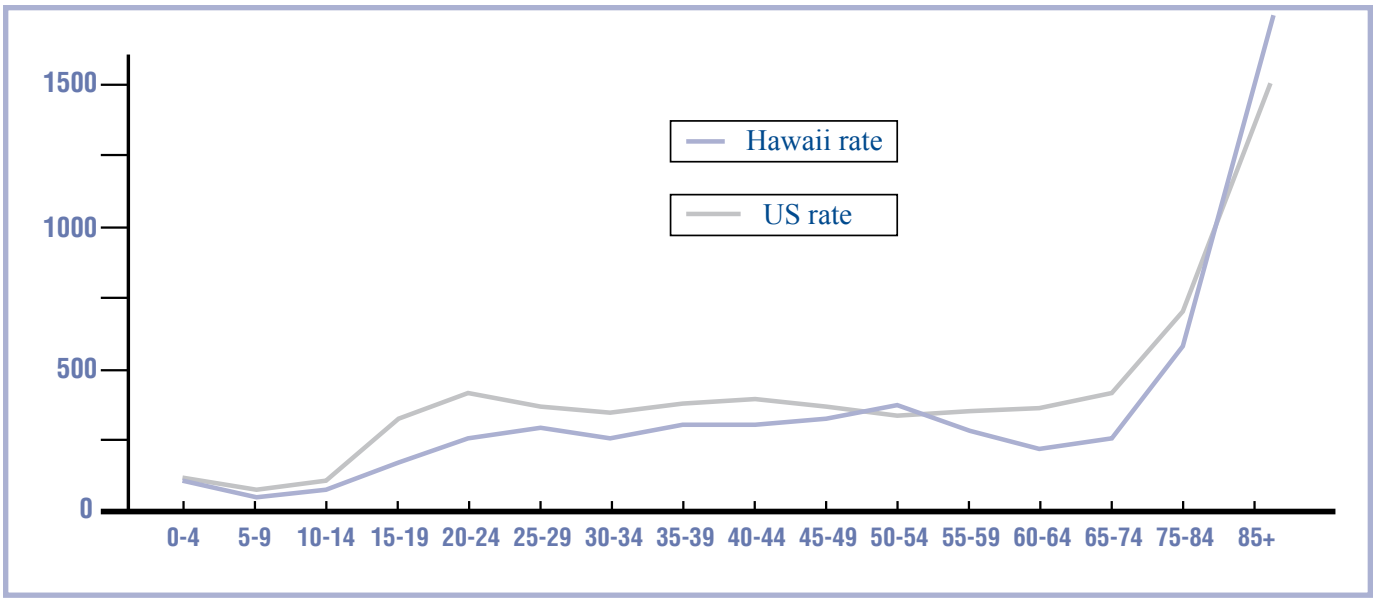
Figure 7. Age-standardized 5-year rates (/100,000) of fatal unintentional injuries among Hawai‘i and (non-Hawai‘i) U.S. residents, by category, 1996-2000.



**Indicates unstable rate estimate, since it was based on relatively few deaths.*
1mvc = motor vehicle crash. Includes non-traffic fatalities (those not occurring on public roads).
2mvt = motor vehicle traffic. Includes only those fatalities that occurred on public roads.

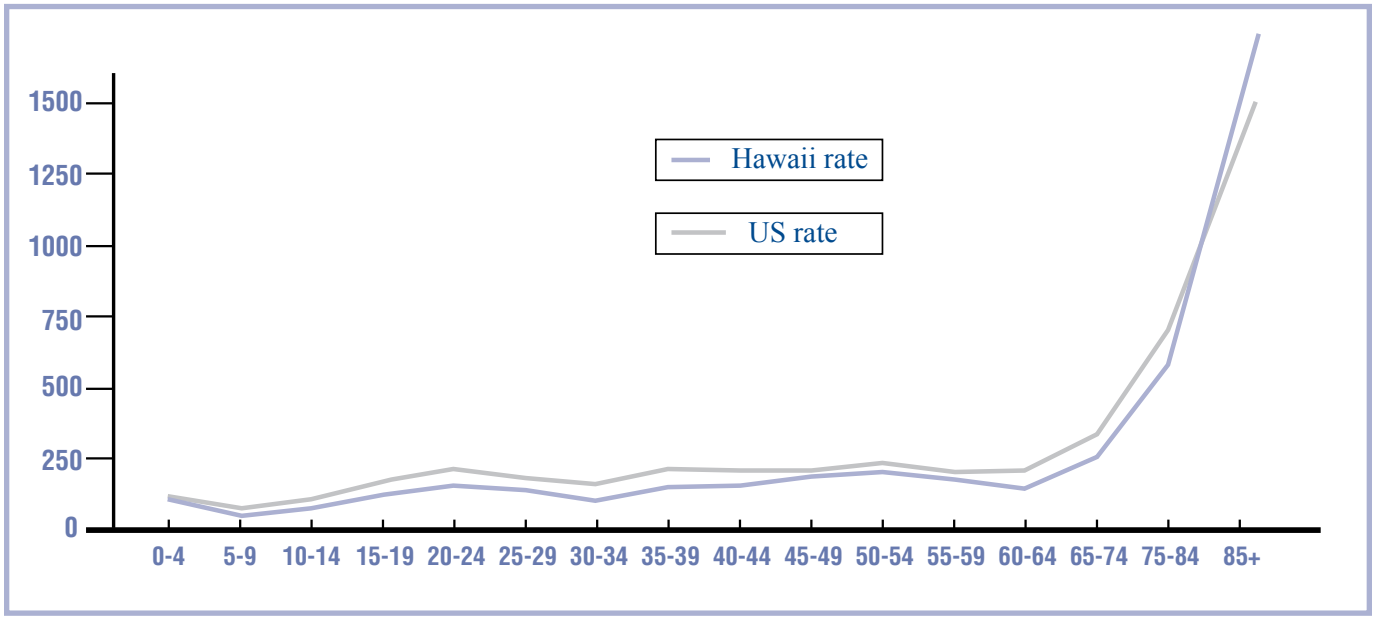
Rates of fatal injuries were lower in Hawai‘i than in the rest of the U.S. in every age group with the exception of 50 to 54 year-olds, and those aged 85 years or older. There were more pronounced differences in early adulthood (around 15 to 30 years of age) and among the elderly (64 to 84 years). The shape of the curve in Hawai‘i was otherwise similar to the rest of the U.S. In Hawai‘i, rates were relatively low during childhood, began to rise around 15 years of age, and then leveled off until a dramatic increase after about 70 years of age.

Figure 8. Five-year rates (/100,000) of fatal injuries among Hawai‘i and (non-Hawai‘i) U.S. residents, by age group, 1996-2000.



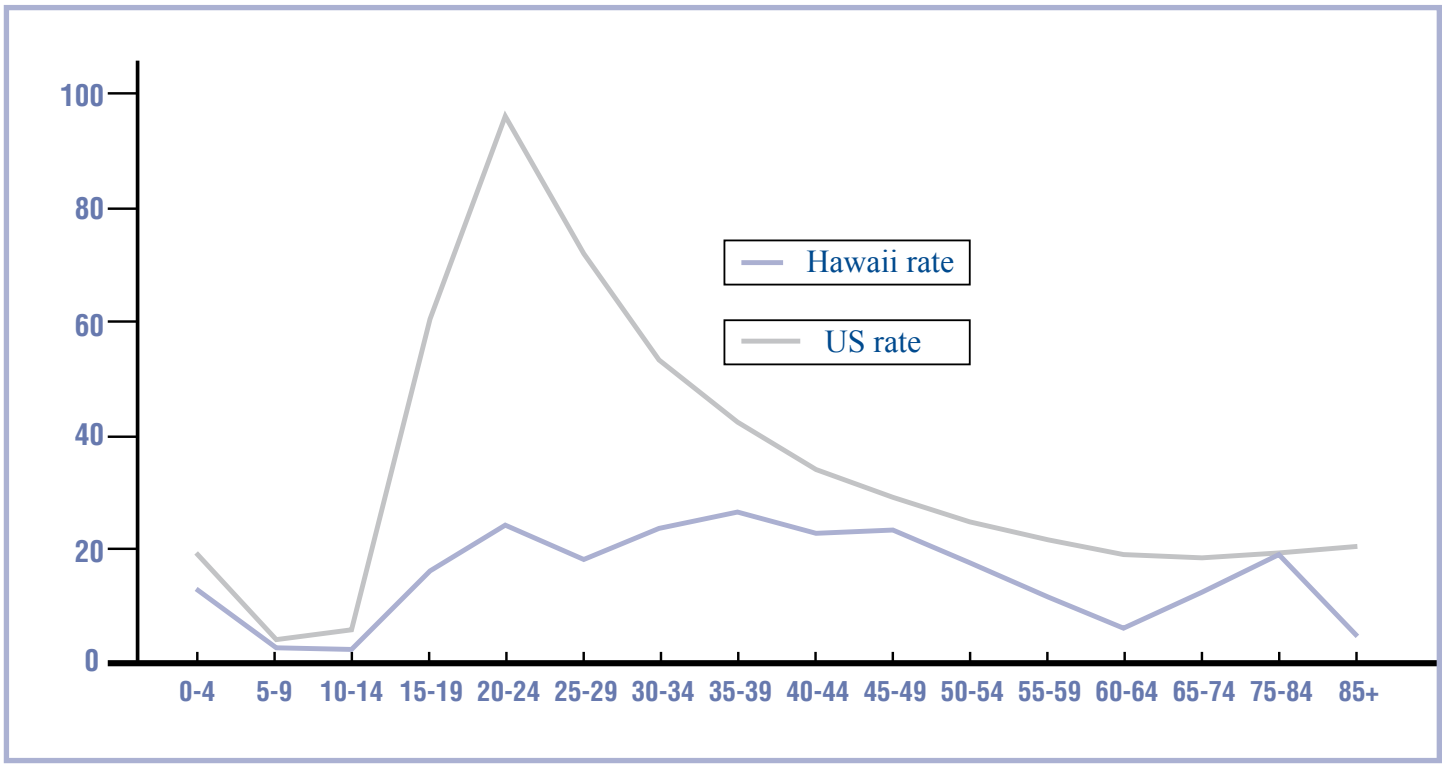
Rates of unintentional injuries (Figure 9) followed an age pattern similar to that for all types of injuries (Figure 8). Again, the (non-Hawai‘i) U.S. rate was higher than the Hawai‘i rate at every age, but particularly in early adulthood and at older ages.

Figure 9. Five-year rates (/100,000) of unintentional injuries among Hawai‘i and (non-Hawai‘i) U.S. residents, by age group, 1996-2000.



Homicide rates were lower in Hawai‘i at every age compared to the rest of the U.S., but particularly for younger adults (ages 15 to 45). There was a pronounced peak at 15 to 39 years of age in the U.S. that was largely absent among Hawai‘i residents.

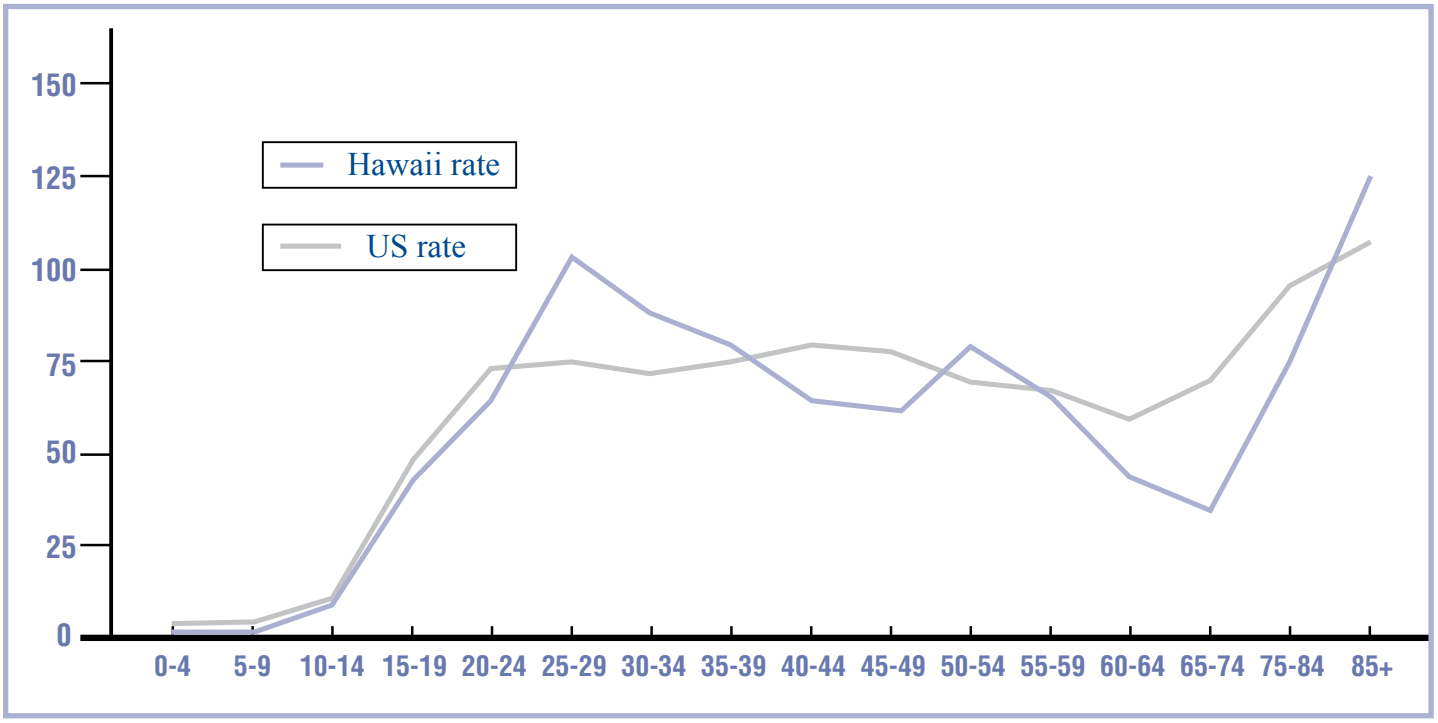
Figure 10. Five-year rates (/100,000) of homicides among Hawai‘i and (non-Hawai‘i) U.S. residents, by age group, 1996-2000.



Homicide rates were lower in Hawai‘i at every age compared to the rest of the U.S...

Age-specific suicide rates were fairly comparable between Hawai‘i and the rest of the U.S. (Figure 11). Rates were close to zero until the teenage years, reached a peak around age 20 and were fairly constant before rising sharply in old age (75 years or older). Rates in Hawai‘i were slightly higher in early adulthood (25 to 35 years), but lower in old age. However, these comparisons are somewhat limited by the low absolute number of suicides in Hawai‘i.

Figure 11. Five-year rates (/100,000) of suicides among Hawai‘i and (non-Hawai‘i) U.S. residents, by age group, 1996-2000.



...suicide rates were comparable between Hawai‘i and the rest of the U.S...

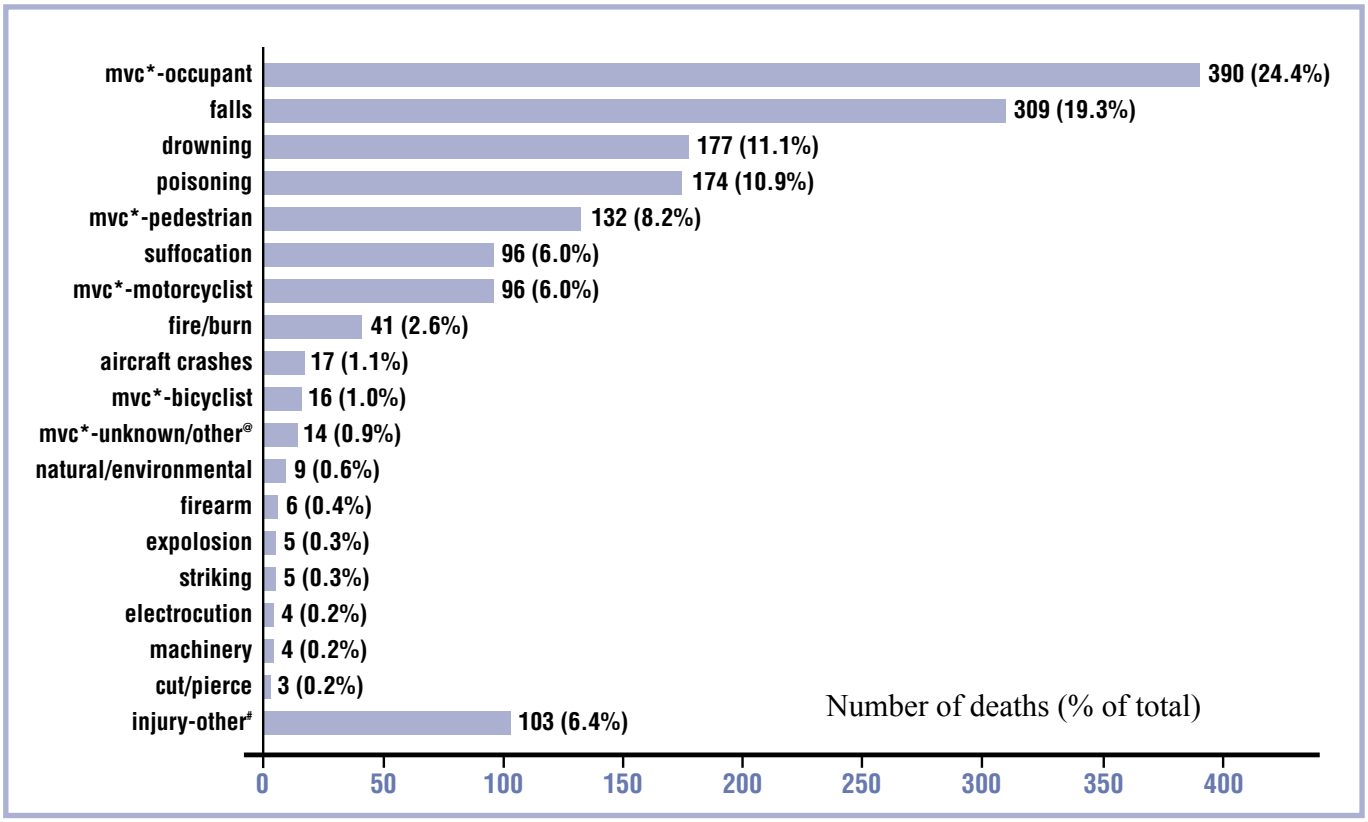
Unintentional injury deaths among Hawai'i residents

Motor vehicle traffic crashes were the dominant cause of the 1,601 unintentional injury deaths (Figure 12). Deaths among drivers and occupants of motor vehicles (excluding motorcycles) accounted for nearly one-quarter of the total number of unintentional injury deaths. The 648 combined vehicular deaths accounted for 40% of the total number of unintentional injury deaths.

After motor vehicle crashes, the most common causes of unintentional injury deaths were falls (19.3% of all deaths), drownings (11.1%), poisonings (10.9%), suffocations (6.0%), and fires or burns (2.6%). The following sections will discuss these more common unintentional injury categories in more detail.

Figure 12. Fatal unintentional injuries among residents of Hawai'i, by injury category, 1996-2000.

(Number in parenthesis is the percent of all unintentional injury deaths.)



*mvc=motor vehicle crash.

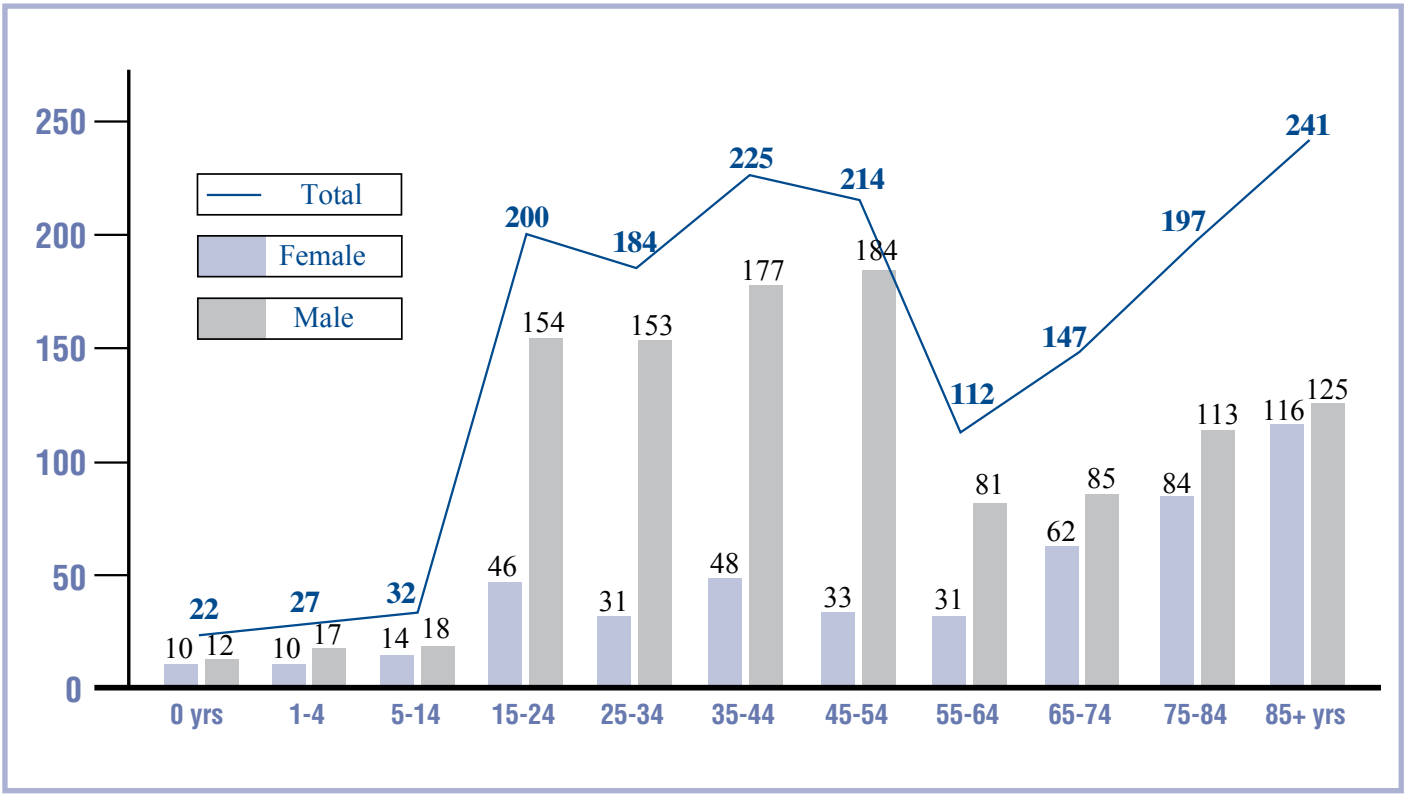
@The "mvc-unknown/other" category includes vehicular deaths for which there was insufficient information to classify the victim as driver, occupant, motorcyclist, bicyclist or pedestrian.

#No information was available for 59 of the 103 "other" injury deaths. Thirty-six of these deaths were due to fractures of unknown causes.

Unintentional injury deaths occurred at all ages, but the graph below shows two particularly noticeable peaks: young adults (ages 15-54) and the elderly (over 75 years).

Male victims outnumber females by more than 2-to-1; 72% (1,147) of the 1,601 victims of unintentional injuries were males, and 29% (454) were females. Figure 13 shows that this gender disparity was most narrow among the youngest (ages 0 to 5) and oldest (ages 70 and older) victims, although the disparity in the latter is at least partly due to the relative longevity of females.

Figure 13. Age and gender distribution of victims of fatal unintentional injuries in Hawai'i, 1996-2000.

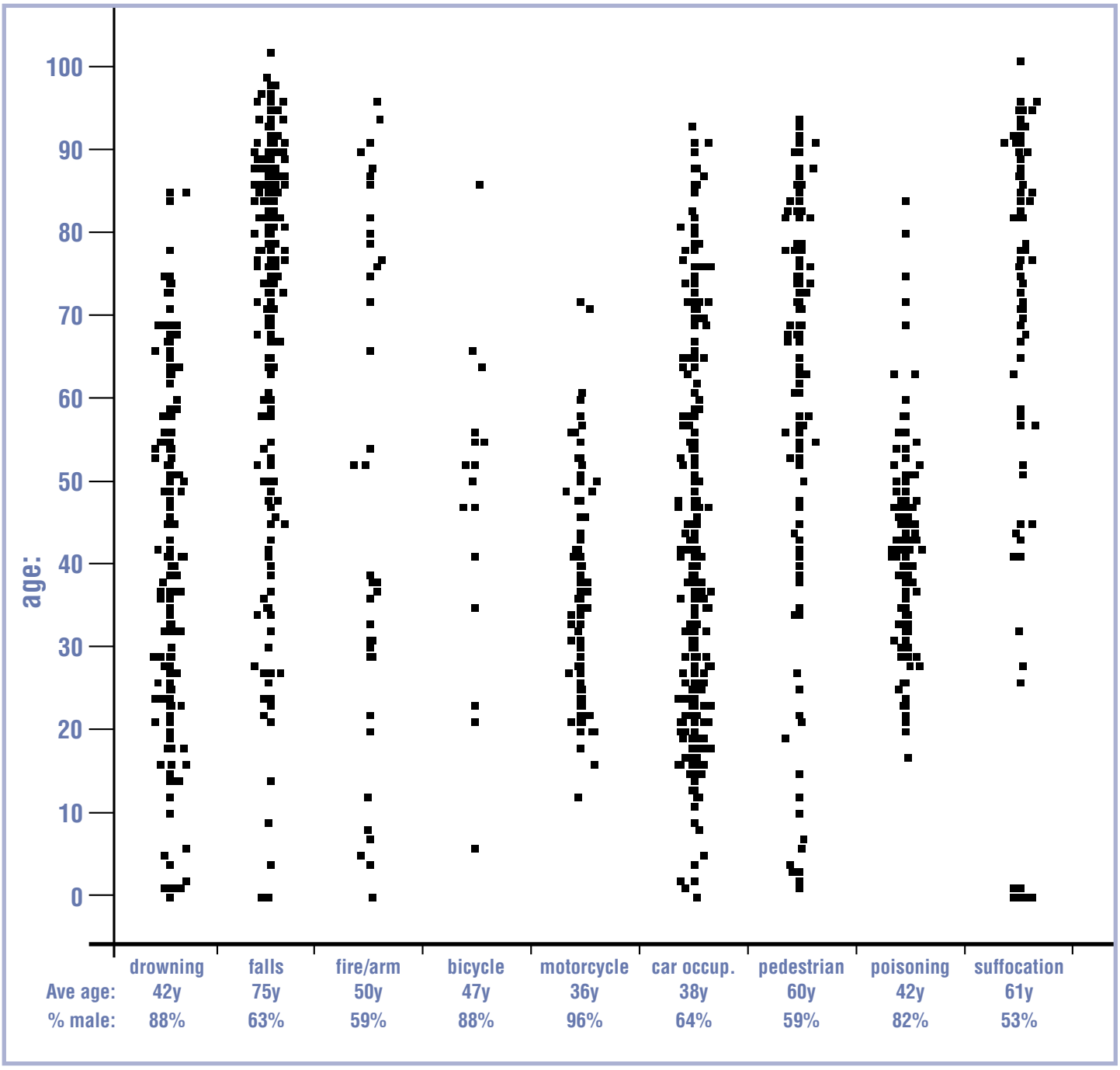


Male victims outnumber females by more than 2-to-1

The age distribution varied somewhat by the category of injury death (Figure 14). For example, while drownings and pedestrian deaths were more evenly distributed across the age range, 76% of the fall victims were 65 years of age or older. These relationships will be examined more closely in later sections.

Similarly, there was some variation in the proportion of gender by the category of injury. Males formed the vast majority of victims who died in motorcycle crashes (96%), bicycle crashes (88%), drownings (88%), and poisonings (82%). Although males still represented the majority, gender was more equally distributed among victims of car crashes (64% were male), falls (63%), fires (59%), pedestrian fatalities (59%), and suffocations (53%).

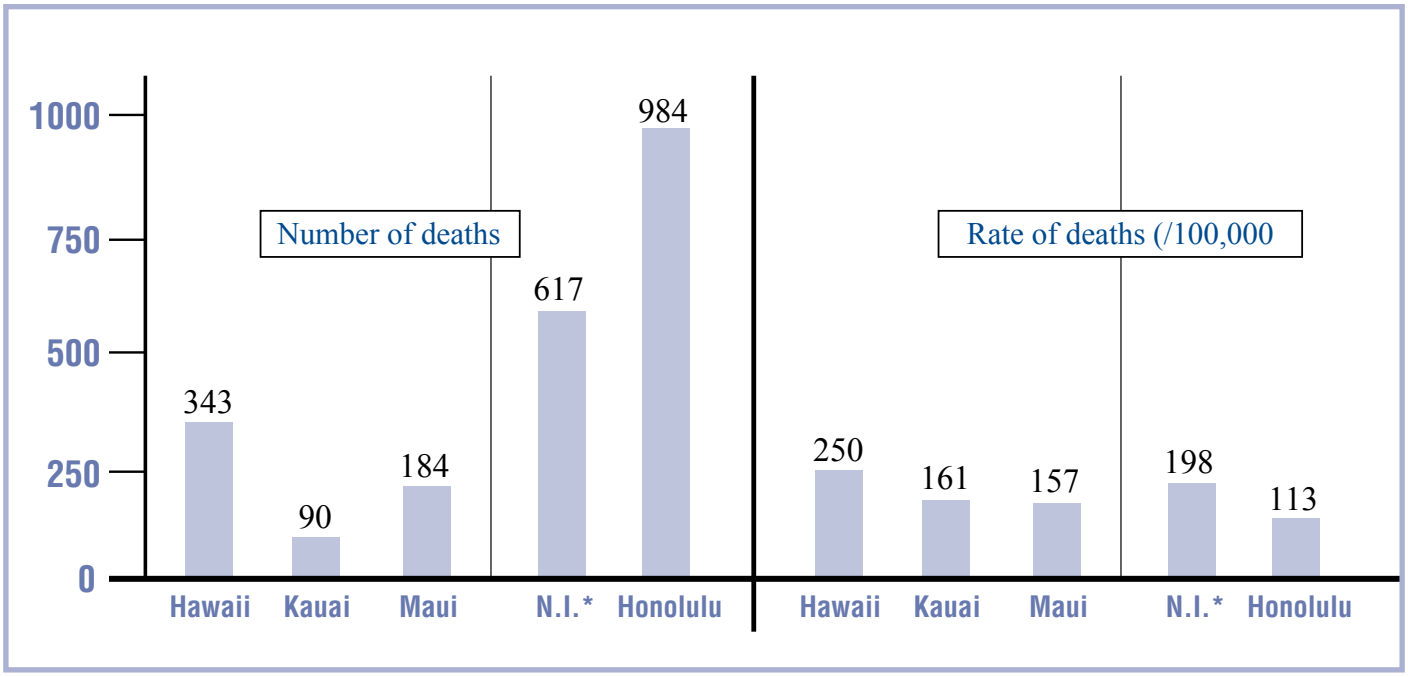
Figure 14. Age distribution of victims of fatal unintentional injuries in Hawai'i,by category, 1996-2000.



More than half (984, or 62%) of the unintentional injuries occurred in Honolulu County. Of the remaining 617 fatalities on the Neighbor Islands, more than half (343, or 56%) occurred in Hawai‘i County. There were 184 deaths in Maui County (11% of the state total), and 90 in Kaua‘i County (6%). (Six of the fatal injury deaths in Maui County were on Moloka‘i, and 3 on Lāna‘i.)

Although the number of fatalities was by far greatest on O‘ahu, Figure 15 shows the rate was actually lowest there, compared to the Neighbor Island counties. In fact, standardized rate estimates were 113/100,000 resident population on O‘ahu, nearly half the estimated rate (198/100,000) for all Neighbor Island counties combined. A particularly high rate was estimated for Hawai‘i County, which was more than twice as high as Honolulu County, and 50% higher than the estimated rates for Maui and Kaua‘i counties. (It should be noted, however, that the rates for Maui and Kaua‘i counties are based on low numbers of deaths and are therefore unreliable estimates.)

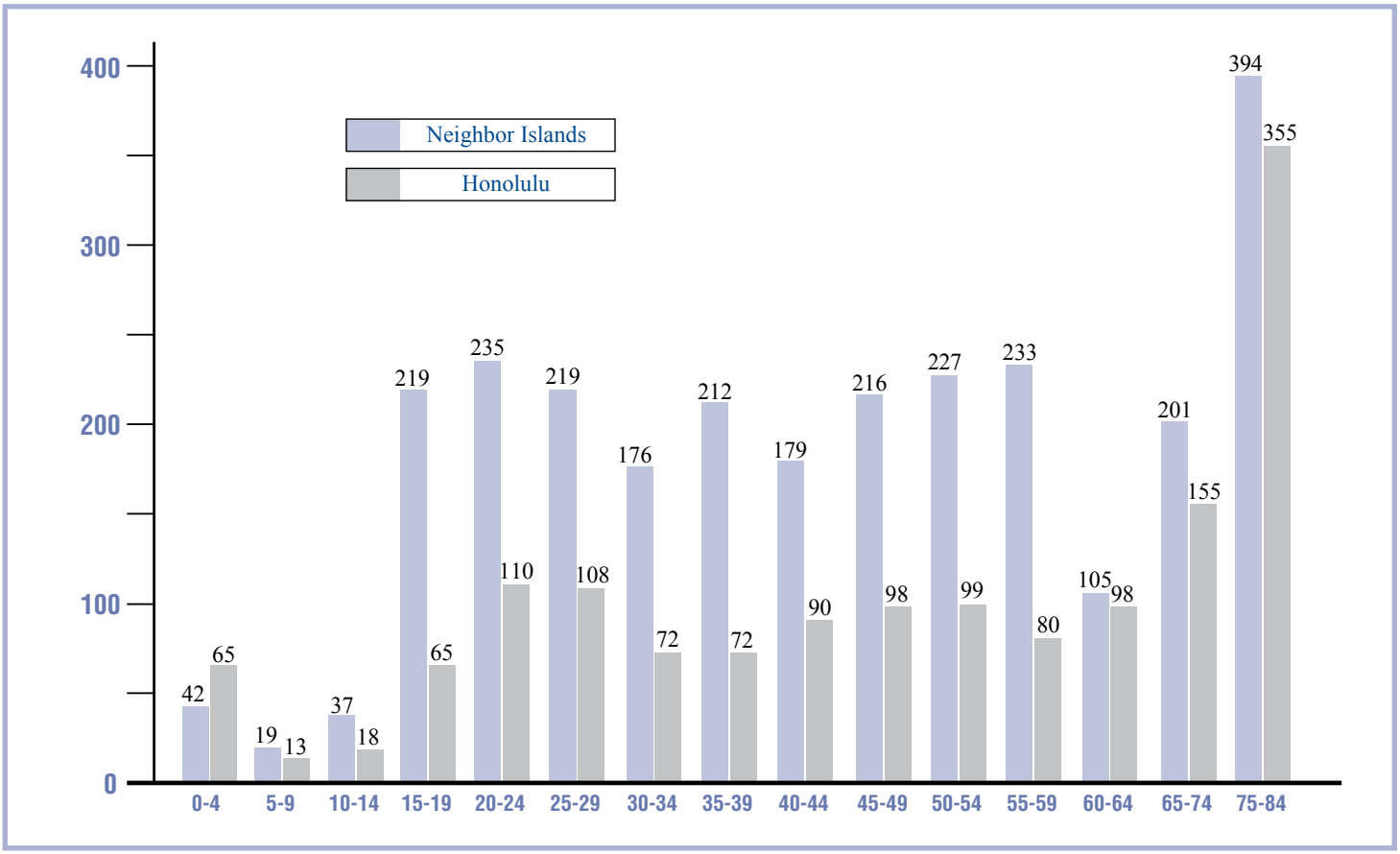
Figure 15. Number and rate of fatal unintentional injuries in Hawai‘i, by county of injury, 1996-2000.



Although the number of fatalities was by far greatest on Oahu, figure 15 shows the rate was actually lowest there, compared to the Neighbor Island counties.

Figure 16 shows that unintentional injury rates were higher on Neighbor Islands at all ages, with the exception of the youngest age group (0 to 4 years). Compared to residents of Honolulu County, rates among Neighbor Island residents were more than doubled for almost all age categories in the 15 to 59 year age range. Rates were more comparable across the two locales for the older victims (ages 60 and over). Rates among the victims aged 85 years and older are not shown, since the scale of the graph would be too big. Rate estimates for this age group were extremely high among both Honolulu (1,426/100,000) and Neighbor Island residents (1,630/100,000).

Figure 16. Rate (/100,000) of fatal unintentional injuries among residents of Hawai'i, by county location of injury and age group, 1996-2000.



**Rates among victims aged 85 years and older: Honolulu: 1,426/100,000, Neighbor Islands: 1,630/100,000.*

There was a greater-than-expected number of deaths among Neighbor Island residents in all unintentional injury categories, except for suffocation deaths (only 16% of the 96 victims were Neighbor Island residents). (Since approximately 27% of the state population resided on the Neighbor Islands over the 5-year period, any injury category in which more than 27% of the victims were Neighbor Island residents was excessive in that regard.) There were especially high proportions of Neighbor Island victims in the motor vehicle categories, specifically deaths among car occupants (56% were residents of Neighbor Islands), motorcyclists (41%), and bicyclists (50%).

Residents of nearly all parts of the island of Hawai‘i were at a higher risk of fatal unintentional injuries than residents of other areas of the state (Figure 17). The dark green shading in Figure 17 shows that all but 1 of the 5 highest risk areas were on the island of Hawai‘i (North Kohala, North Hilo, Puna, and Hāmākua). "High" rates were also computed for the South Hilo and North Kona areas, with the remaining 3 districts falling into the "medium" risk category. Other "high" risk districts on the Neighbor Islands were Waimea on Kaua‘i and Hāna on the island of Maui. Most of the areas on O‘ahu, by comparison were relatively low risk. There was only 1 (Ko‘olauloa) in the "highest" category, and 2 (North Shore and Wai‘anae) in the "high" category. Rates in central O‘ahu and areas around Pearl Harbor were all in the "lowest" rate category, along with the windward communities of Kāne‘ohe and Kailua. Rates in the metropolitan area of Honolulu (shown in more detail in Figure 18) were somewhat higher, but still fell in the "low" or "medium" categories.

Figure 17. Rates of fatal unintentional injuries among Hawai‘i residents, by area of residence, 1996-2000.

(Rate is per 10,000 residents, estimated in 2000. Number of deaths is shown in parentheses. Rates based on 20 or fewer deaths are unreliable and should be interpreted with caution.)

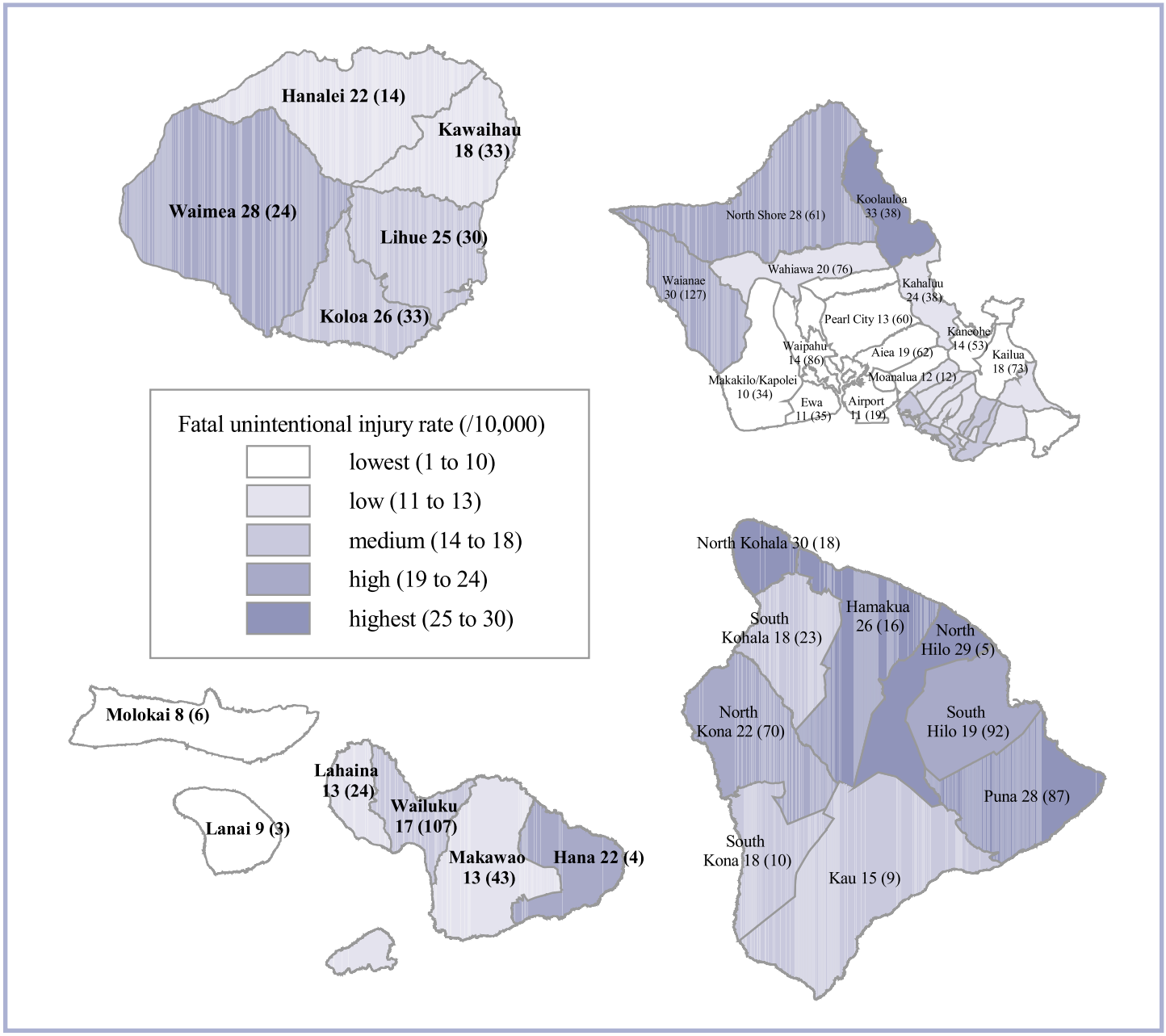
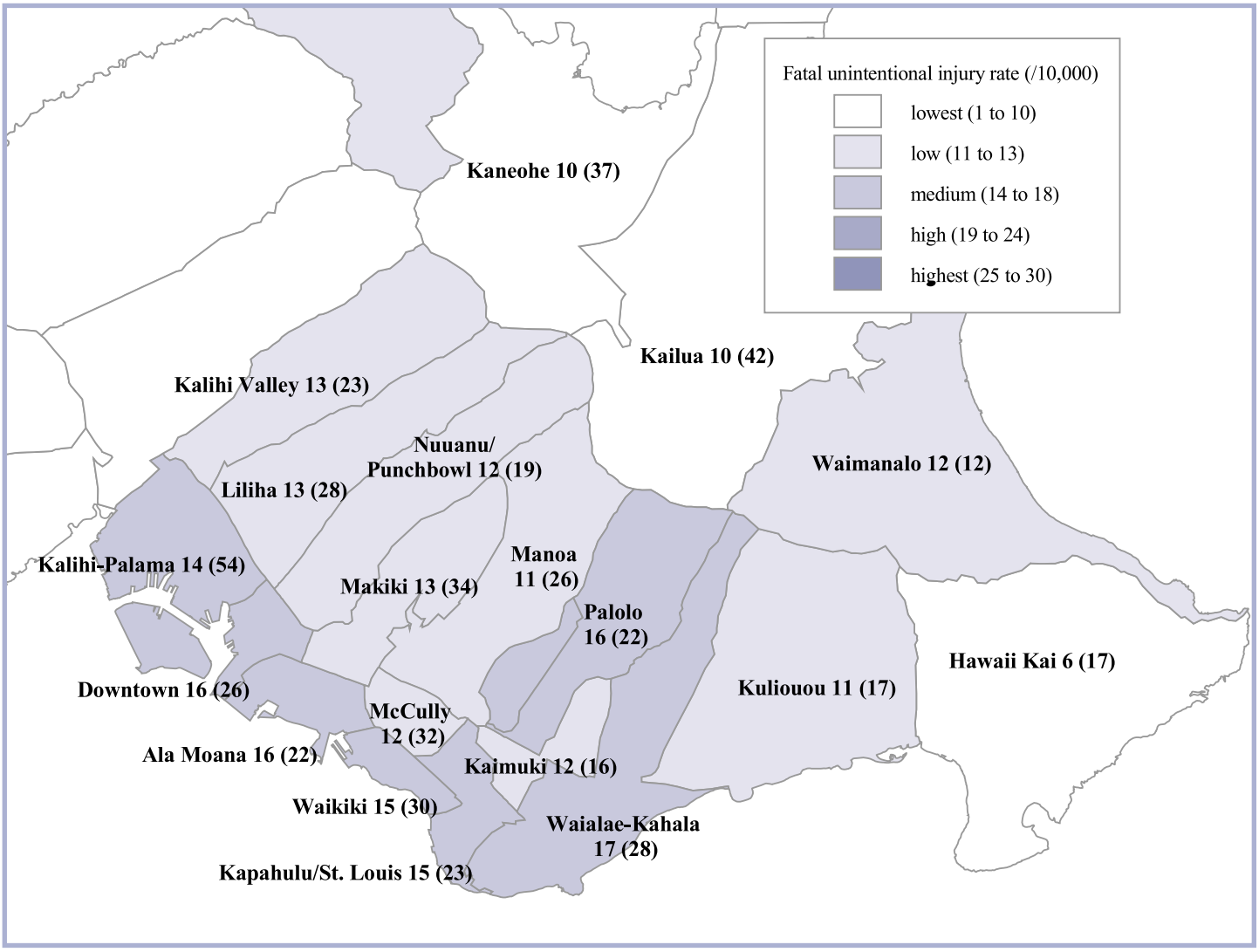


Figure 18. Rates of fatal unintentional injuries among residents of eastern O'ahu, by area, 1996-2000.

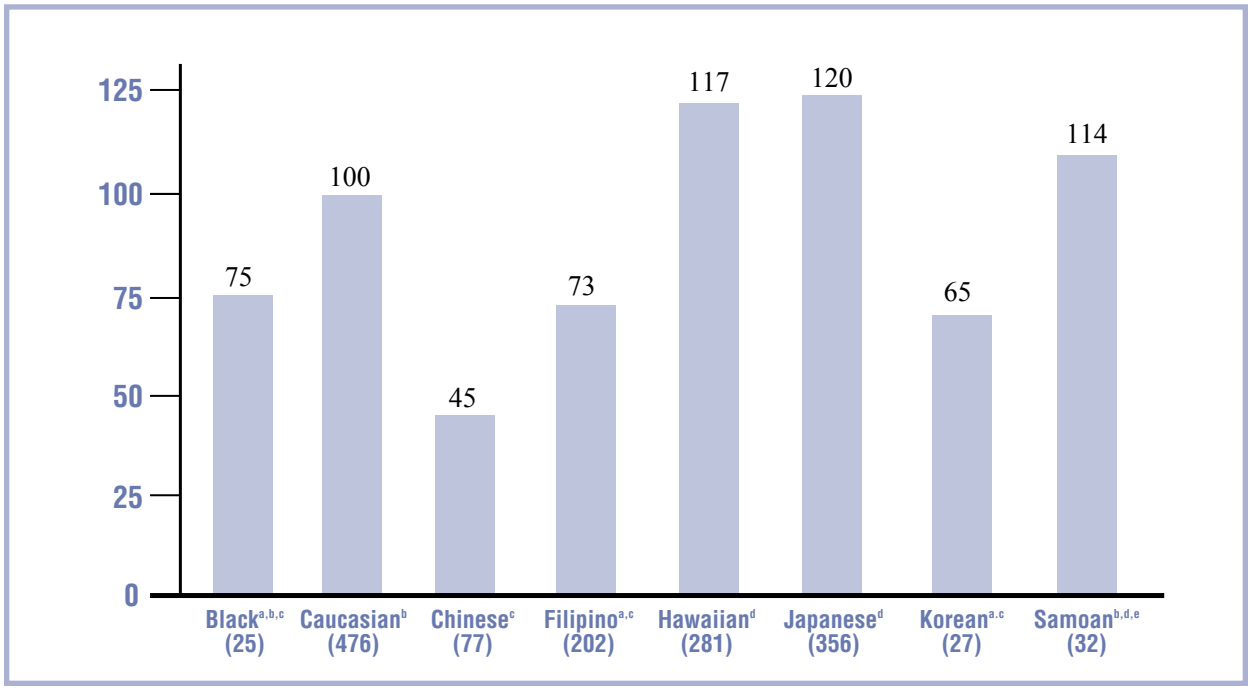
(Rate is per 10,000 residents, estimated in 2000. Number of deaths is shown in parentheses. Rates based on 20 or fewer deaths are unreliable and should be interpreted with caution.)



There were significant differences in the rates of fatal unintentional injuries among the 8 main ethnicities residing in Hawai'i (Figure 19). The highest rates were computed for residents of Japanese, Hawaiian/part-Hawaiian, and Samoan ancestry, although the latter estimate was based on relatively few deaths. A relatively low number of deaths results in a less precise rate estimate, and therefore lower likelihood of finding statistically significant differences between groups. For example, the rate difference between Caucasians and Japanese (17/100,000) was statistically significant, while that between Caucasians and Samoans (14/100,000) was not, even though the absolute rate differences are similar. The rate among Caucasian residents was intermediate, significantly lower than that for some ethnicities (Hawaiians/part-Hawaiians and Japanese), and significantly higher than that for others (Chinese, Filipinos, and Koreans). Chinese residents had the lowest rates, significantly lower than all other ethnic groups, except for Blacks and Koreans. The rates among Koreans, Blacks, and Filipinos were all statistically comparable. The combined rate for the 3 ethnicities with the highest rates (Hawaiian/part-Hawaiian, Japanese, and Samoans) was nearly twice that for the 4 ethnicities with the lowest rates (Black, Chinese, Filipino, and Korean) (119/100,000 vs. 64/100,000, for the respective groups).

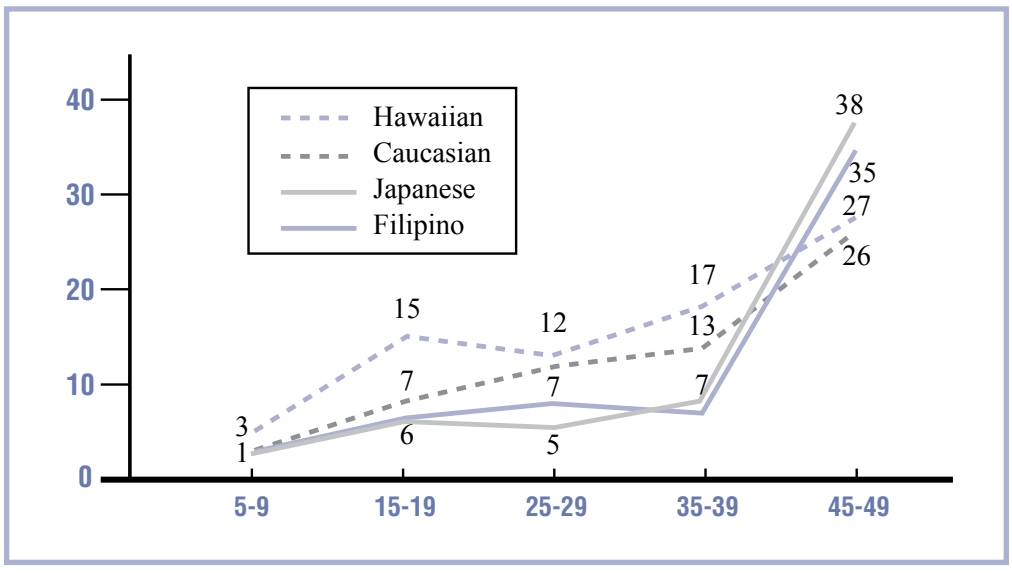
Figure 19: Unadjusted rates (/100,000) of fatal unintentional injuries, by ethnicity, 1996-2000.

(Number of deaths given in parentheses in bottom labels. Groups with the same superscripted letter have statistically comparable rate estimate.)



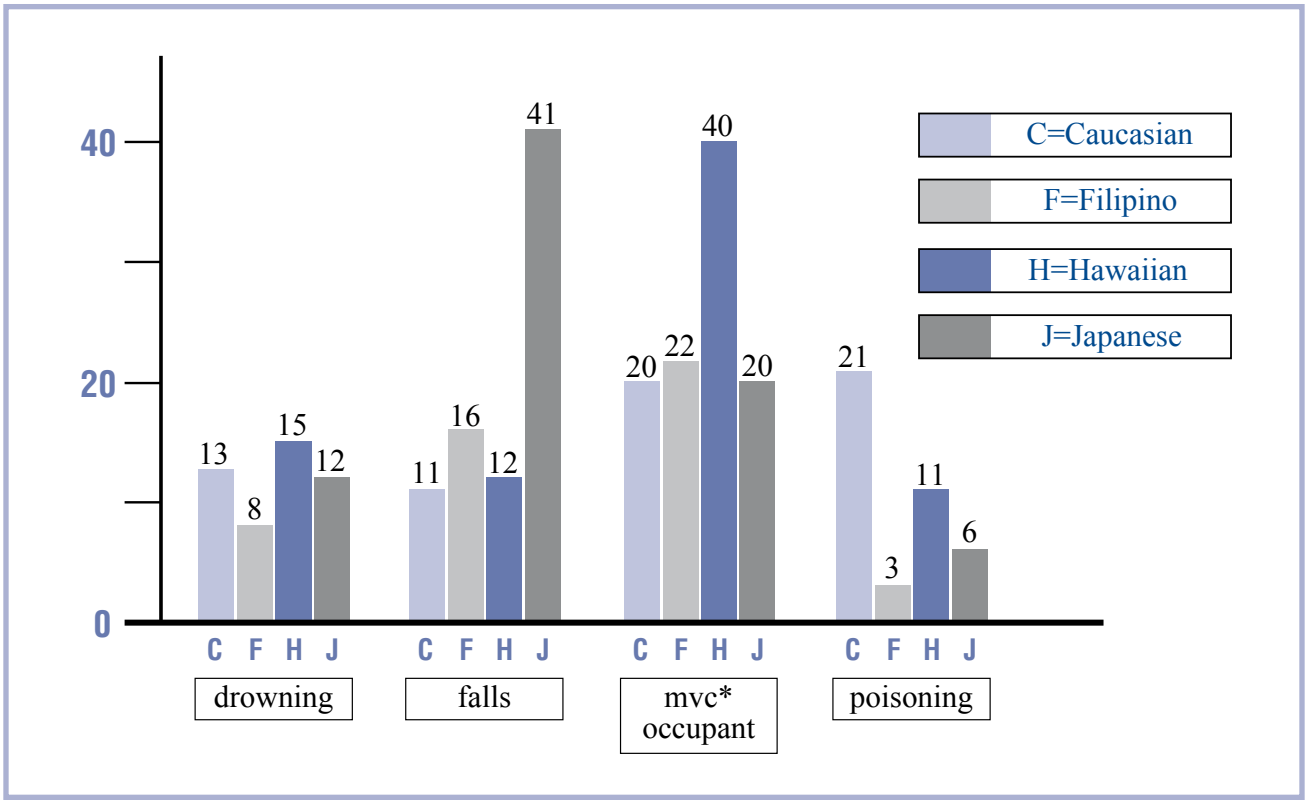
Fatal unintentional injury rates were computed for different age groups within the 4 ethnicities in which there were at least 200 deaths (Figure 20). For all 4 ethnicities, the rates were lowest for the youngest residents (0 to 14 years), and then rose sharply after age 65. However, the shape of that overall rise varied between ethnicities. For example, the rates for Hawaiians/part-Hawaiians were significantly higher than rates for Filipino and Japanese residents in all age groups between 15 and 64 years, but were lowest among senior-aged Hawaiian/part-Hawaiian residents. These trends were largely paralleled by Caucasian residents, except for the rate among 15 to 29 year-olds, which was significantly lower than that for Hawaiians/part-Hawaiians.

Figure 20: Unadjusted rates (per 100,000) of fatal unintentional injuries, by age group and ethnicity, 1996-2000.



Further analyses examined ethnic-specific rates for the main unintentional categories of drowning, falls, motor vehicle occupant, and poisoning. These categories accounted for two-thirds (66%, or 869) of the 1,315 fatal unintentional injuries among these 4 ethnicities. Figure 21 shows that much of the excess risk among Hawaiian/part-Hawaiian residents is due to significantly higher rates of death among motor vehicle occupants, while much of the excess among Japanese residents is due to fatal falls (predominantly among victims aged 65 years or older). The drowning rates were generally comparable across the 4 ethnicities, although the rate for Filipinos was significantly lower than those for Caucasian and Hawaiian/part-Hawaiian residents. Poisoning rates among Caucasians were significantly higher than those for the other 3 ethnicities.

Figure 21: Unadjusted rates (per 100,000) of fatal unintentional injuries, by category and ethnicity, 1996-2000.



…much of the excess risk among Hawaiian/part-Hawaiian residents is due to significantly higher rates of death among motor vehicle occupants, while much of the excess among Japanese residents is due to fatal falls…

Motor vehicle crashes

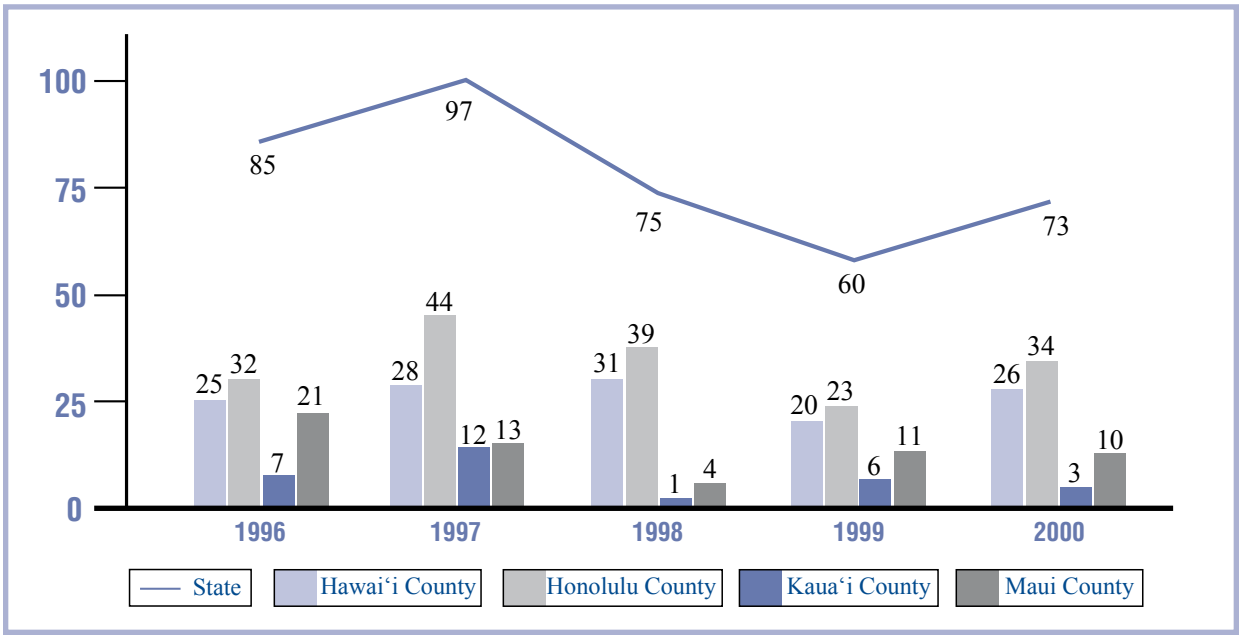
Deaths from motor vehicle crashes are categorized into 4 main types: those among the occupants of automobiles (excluding motorcycles), motorcyclists, bicyclists and pedestrians. There is a separate section for each of these categories, since the demographics and risk factors are different for each.

Motor vehicle occupants:

Motor vehicle crashes were the most frequent type of unintentional injury death in Hawai‘i, with 390 occupant fatalities over the 5-year period. Figure 22 shows that the annual number of such deaths has generally decreased from the total of 97 victims in 1997. This decreasing trend was statistically significant, with an estimated 8% annual decrease in the rate (95% confidence interval: 1% to 14%). The 390 victims were killed in 343 separate crashes, as only 308 of the crashes involved a single fatality. There were 26 crashes with 2 victims each, 6 crashes with 3 victims each, and 3 crashes with 4 victims in each crash.

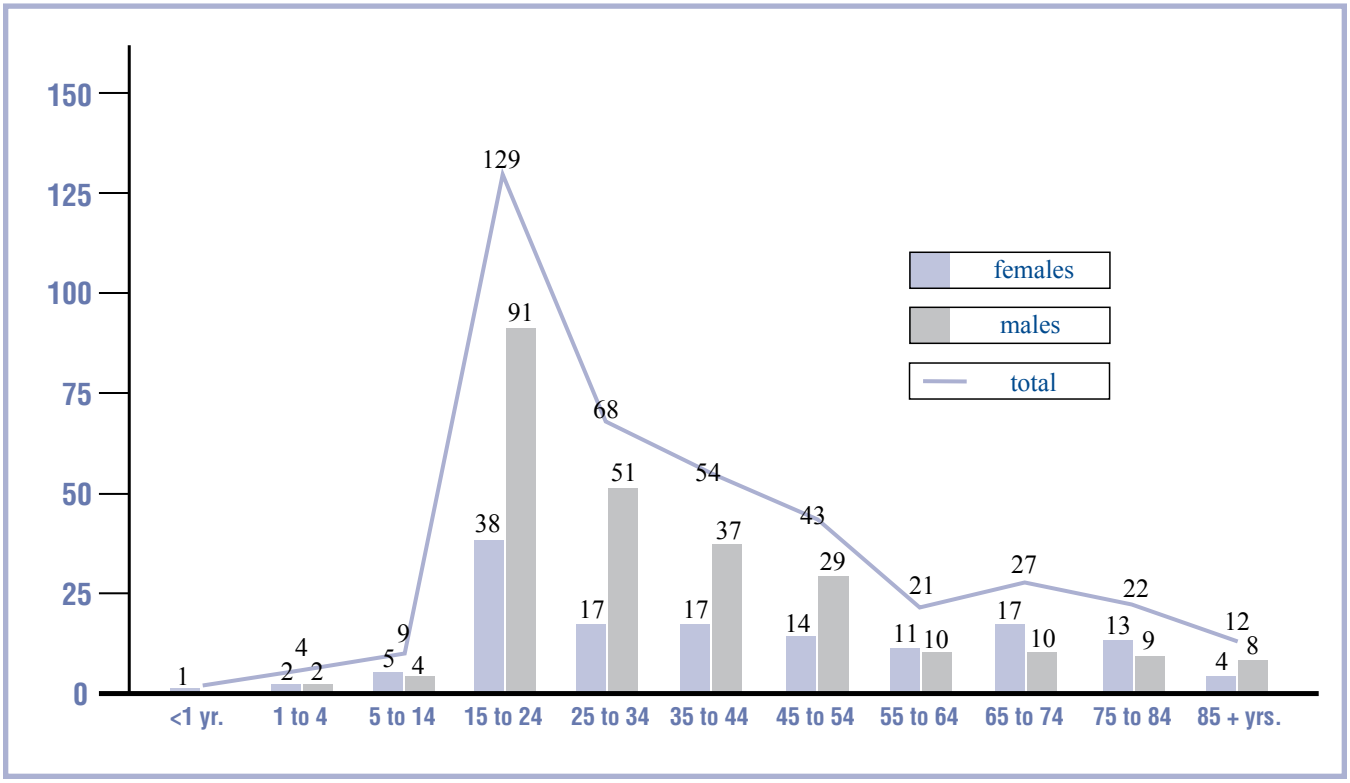
Fewer than half (172, or 44%) of the victims were injured in Honolulu County. One-third were killed in Hawai‘i County, which is notable since only 12% of the population of the state resides in this county. Maui and Kaua‘i counties accounted for 15% and 7% of the victims, respectively. All but 2 of the 59 people who were killed in Maui County were injured on the island of Maui. (One was injured on Lāna‘i and one on Moloka‘i.)

Figure 22. Annual number of fatally injured car occupants in Hawai‘i, by county, 1996-2000.



The age distribution (Figure 23) showed a peak of fatalities in the 15 to 24 year age group. One-third (129, or 33%) of the 390 victims were in this age range. Another third (122, or 31%) of the victims were 25 to 44 years of age. Very few (14, or 4%) of the victims were under 15 years of age. Male victims (251) outnumbered females (139) by an approximately 2-to-1 ratio. The graph also shows that ratio was lower in the very young and very old age groups.

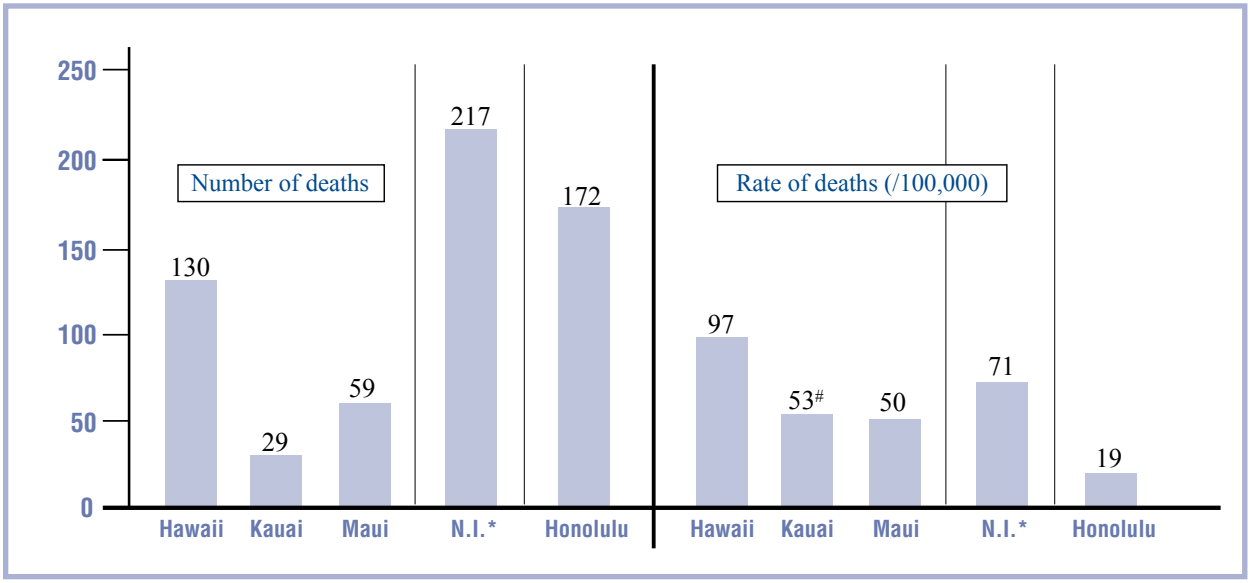
Figure 23. Age and gender distribution of fatally injured car occupants in Hawai'i, 1996-2000.



Although the highest number of victims were injured on O'ahu, the rate of fatal car occupant injuries was much higher among Neighbor Island residents (Figure 24). Rates among residents of Hawai'i County were particularly high, more than 5 times higher than that computed for Honolulu County. Rates for Kaua'i and Maui counties were also significantly higher than the rate for Honolulu, but those are based on relatively small numbers of fatalities. When considered as a whole, rates among Neighbor Island residents were nearly 4 times higher than rates among residents of Honolulu County. These rate differences are similar if the county-specific estimates for vehicle miles traveled is used as the denominator, instead of resident population: Rates for Hawai'i County are significantly higher than for all the other counties. The rates for Honolulu are lower than those for Maui and Kaua'i counties, which are not significantly different from each other.

Figure 24. Number and rate of fatal injuries among car occupants in Hawai'i, by county of injury, 1996-2000.

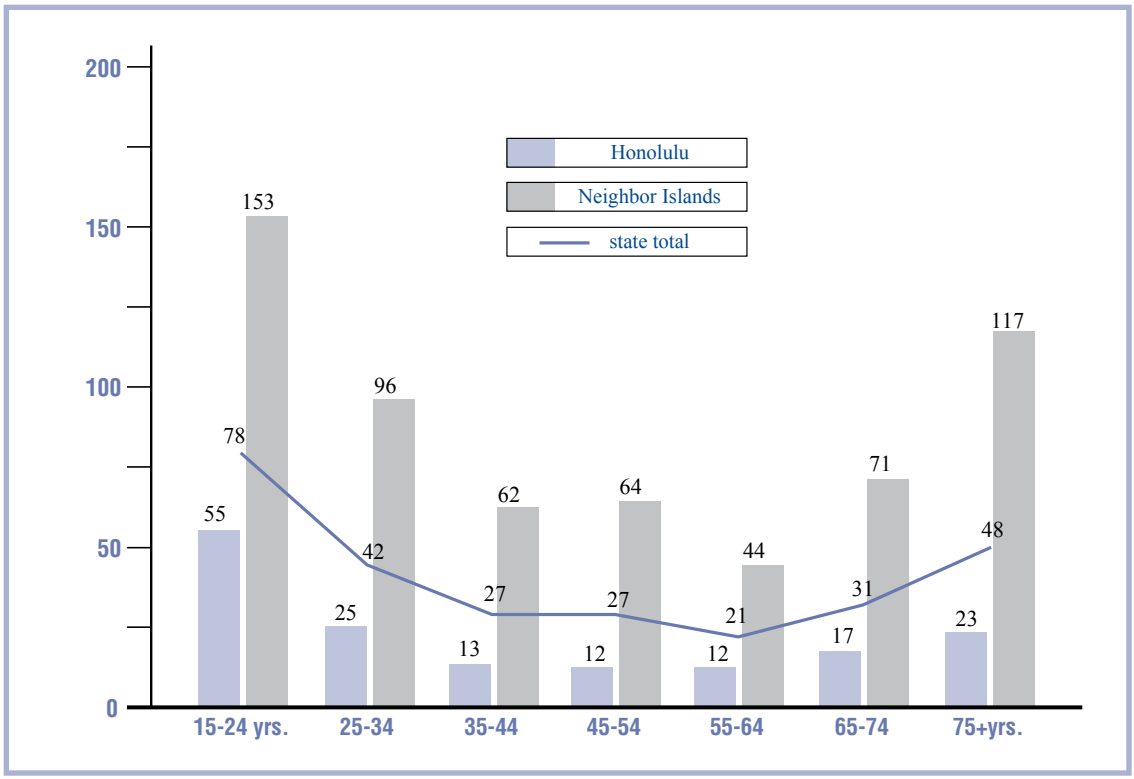
(Rate is per 100,000 residents, age adjusted to the 2000 U.S. population distribution.)



**N.I. = Neighbor Islands (combined totals for Hawai'i, Kaua'i, and Maui counties.)*
#Denotes unreliable rate estimate, since it was based on low number of deaths.

Figure 25 shows that the pronounced rate differences between Neighbor Island residents and O'ahu residents are evident in every age group. (Rates were not computed for victims younger than age 15, as the numbers were too small.) The graph also shows the general pattern of car occupant fatality rates: highest in the 15 to 24 year age group, then leveling off before increasing in the senior age groups.

Figure 25. Five-year rates (/100,000) of fatal car occupant injuries among residents of O'ahu, and Neighbor Islands, by age group, 1996-2000.



The 390 victims were killed in 345 separate crashes which involved over 550 cars. (The latter is not an exact figure because not all fatalities could be matched to FARS records.) About one-half of these were single car crashes, caused by loss of control by the driver. As many as 4 people died in a single crash, although almost all (312, or 90%) of the 345 crashes involved a single fatality. About two-thirds (266, or 68%) of the victims were drivers of the vehicle involved in the crash, and about one-third (120, or 31%) were passengers. (This status was not known for 4 (1%) of the victims.)

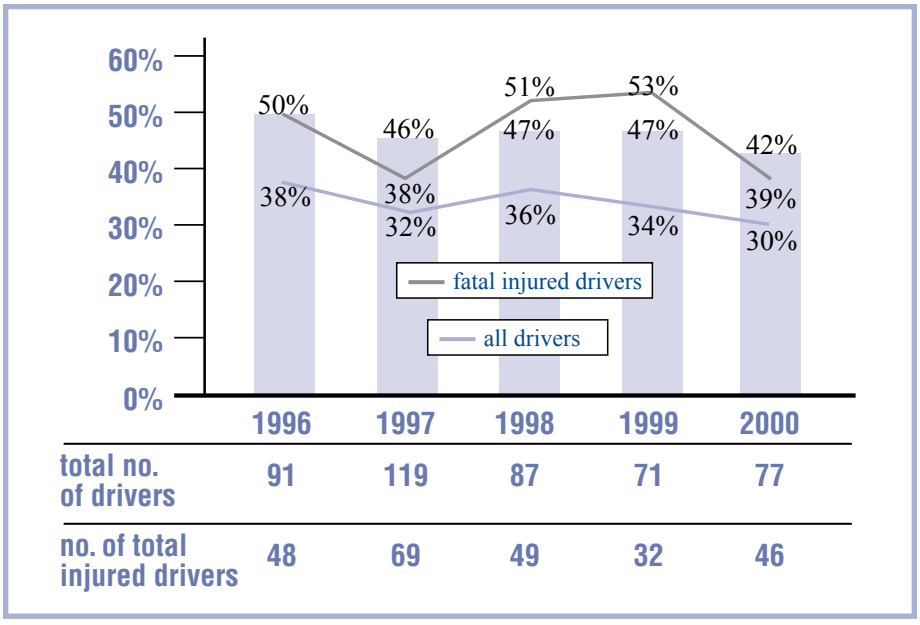
The highest number of crashes occurred in the summer months of June (39 crashes), July (36) and August (39). This 3-month period accounted for exactly one-third (114, or 33%) of the 345 crashes; only 25% would be expected to occur in 3 months by chance alone. In each of the other months except May (31 crashes) there were between 21 and 28 fatal crashes. Saturdays (65 crashes) and Sundays (56) were the most common days for fatal crashes. Only 41 to 48 crashes occurred during the weekdays. The highest number of crashes (73, or 21%) occurred during the 3-hour period of midnight to 2:00 a.m. About half (188, or 54%) of the crashes occurred during nighttime hours (7:00 p.m. to 5:00 a.m.).

Most (361, or 93%) of the fatalities could be linked to FARS records which contain information on the involvement of alcohol, seat belt use and other risk factors in the crash. The blood alcohol concentration (BAC) of individuals in the FARS data was categorized as none, some (BAC between 0.01% and 0.09% (gm/dl)), or driving under the influence (DUI) (BAC 0.10% or more). If the BAC level was missing in FARS, one of the above 3 categories was imputed for the individual, using a discriminant function model. Over the 1996-2000 period, the BAC was imputed for 13% of the drivers who died in crashes in Hawai‘i and for 68% of the drivers who survived. FARS data was available for 245 (of 266) drivers who were fatally injured over the 5-year period, including a determination of alcohol use for all but 1 of those drivers.

The proportion of fatally injured drivers who had used alcohol varied erratically from one-third to roughly one-half over the period (Figure 26). The proportion who were over the level for DUI varied in parallel, between 29% and 47%. Overall, 45% (110 of 244) of the fatally injured drivers had used alcohol, and more than one-third (90, or 37%) were over the DUI level. Figure 26 also shows the proportion of alcohol use among all drivers, regardless of whether or not they survived the crash. That proportion varied inconsistently from 38% to 30%. The bars in Figure 26 show that the proportion of crashes that involved alcohol also varied inconsistently between 50% and 42%. Overall, almost half (46%) of the crashes involved alcohol use by at least one driver.

Figure 26. Alcohol use (percent) among car drivers involved in fatal crashes in Hawai‘i, by year, 1996-2000.

(Bars show annual proportion of fatal crashes that involved alcohol.)

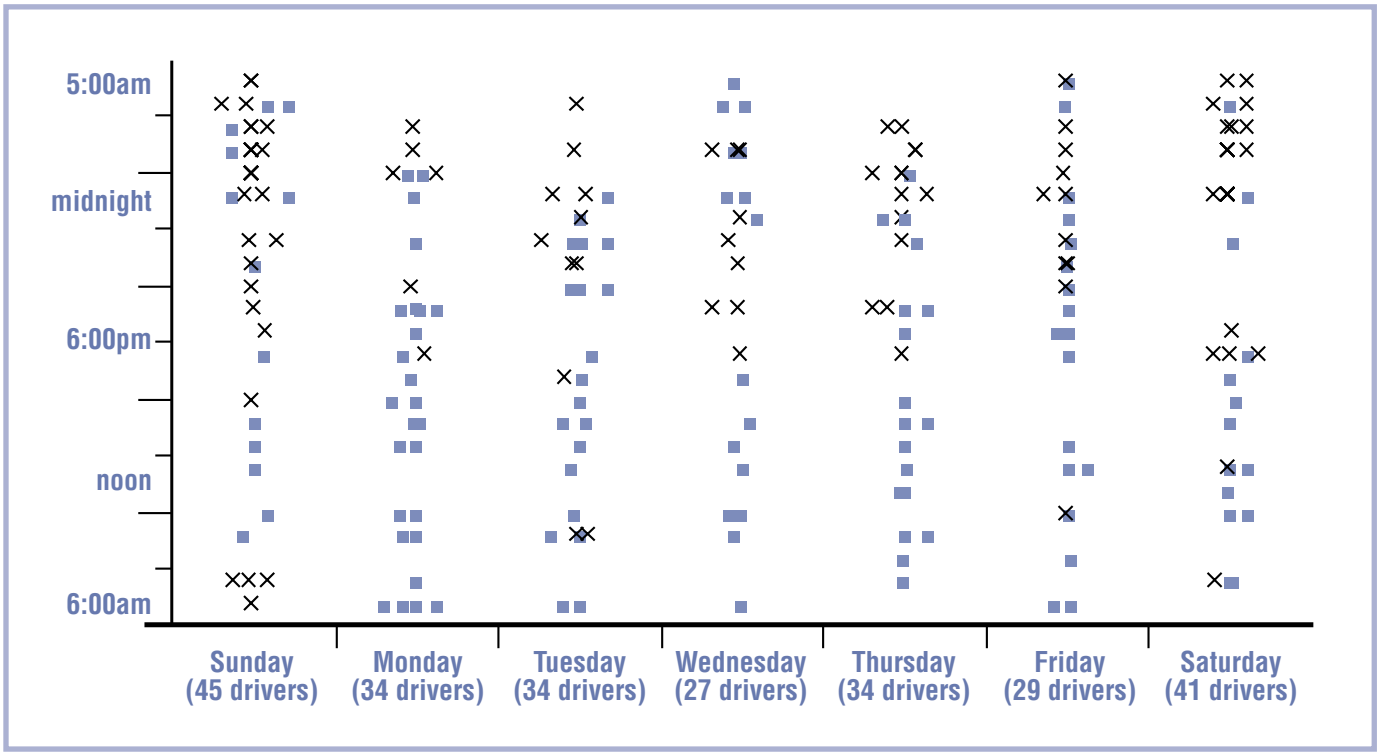


Among the 140 fatally injured drivers who crashed between 7:00 p.m. and 5:00 a.m., almost two-thirds (88, or 63%) had been drinking, and more than half (78, or 56%) had blood alcohol concentrations (BAC) levels of 0.09 or greater.

There were strong associations between alcohol use by the fatally injured drivers and the day and time of the crash (Figure 27). Drinking was much more common among drivers who crashed on Sundays (71%, or 32 of 45) and Saturdays (66%, or 27 of 41) than among drivers who crashed on weekdays (32%, or 51 of 158). The figure also clearly shows that alcohol involvement was common in crashes that occurred during nighttime hours. Among the 140 fatally injured drivers who crashed between 7:00 p.m. and 5:00 a.m., almost two-thirds (88, or 63%) had been drinking, and more than half (78, or 56%) had blood alcohol concentrations (BAC) levels of 0.09 or greater. In contrast, only 19% (19 of 99) of the drivers who crashed during daylight or evening hours (6:00 a.m. to 6:00 p.m.) had been drinking, and only 10% (9 drivers) were DUI.

Figure 27. Temporal characteristics of fatal car crashes in Hawai'i, by alcohol status of drivers, 1996-2000.

(Vertical axis shows time of day of crash, horizontal axis shows day of week. Drivers who had been drinking are indicated by "x", non-drinkers by squares.)



Does not include 5 drivers for whom time of crash was not known.

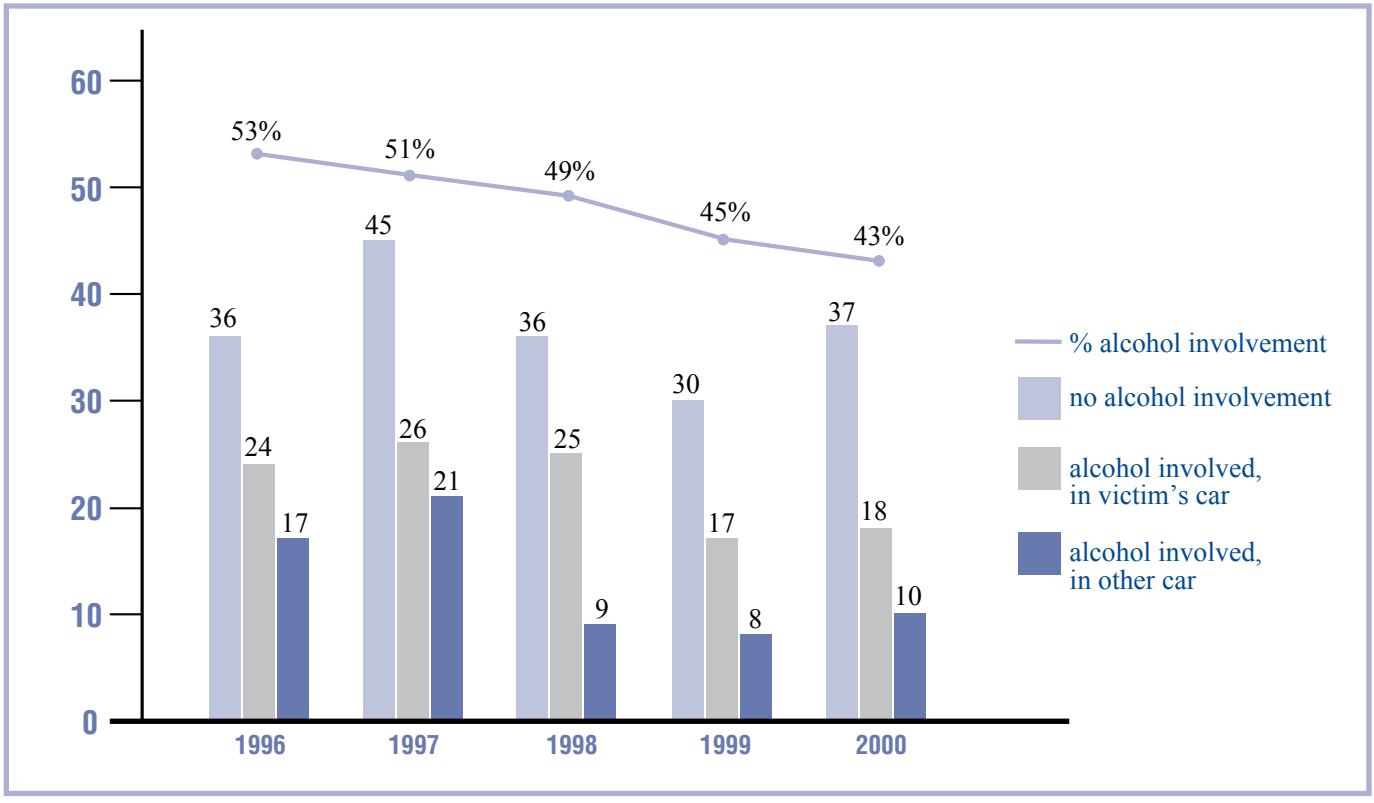
Alcohol use was significantly higher among the fatally injured male drivers (52%, or 89 of 172), compared to female drivers (29%, or 21 of 72). Drinkers also tended to be much younger than non-drinking drivers (average age 32 vs. 44 years). Alcohol use was marginally higher among drivers who were killed on O'ahu (52%, or 54 of 104), than those killed on Neighbor Islands (40%, or 56 of 140).

Figure 28 below shows the extent of alcohol involvement in the total number of victims killed in car crashes. (As opposed to only the drivers killed in those crashes, as shown in Figure 26.) There was a marked decreasing trend in the percentage of car crash fatalities that involved alcohol, from 53% to 43% over the 5-year period. While this is an encouraging trend, it is important to note that there was no commensurate decrease in the annual percentage of drivers who had used alcohol in fatal crashes (Figure 26, above). Closer examination of this inconsistency revealed there were more single victim crashes that involved alcohol over the course of this 5-year period. For example, 85% of the alcohol-related crashes in 1996 were single victim crashes, but that proportion increased to 92% by 2000. Consequently, the decreasing trend shown in Figure 28 may more reflect decreases in the average number of people killed in alcohol-related crashes over time, rather than decreases in the proportion of drivers under the influence of alcohol.

Figure 28 also shows the involvement of alcohol in the fatalities, relative to the car the victim was riding in (or driving) versus the other car(s) involved in the collisions. About two times out of three (63%, or 110 of 175) alcohol involvement was attributed to the car of the victim. Conversely, about 1 of every 3 victims involved in an alcohol-related crash are hit by a driver who had been drinking.

Figure 28. Annual number of victims of car crashes in Hawai'i, by alcohol involvement in the crash, 1996-2000.

(Top line shows the annual percent of all fatalities that involved alcohol.)



Most of the victims (54%, or 178 of the 327 victims for whom this information was available) were not wearing a seat belt at the time of the crash. That proportion varied inconsistently between 39% and 45% for all years, except for 1998 (61%). There was little difference in seat belt use and the county in which the injury occurred.

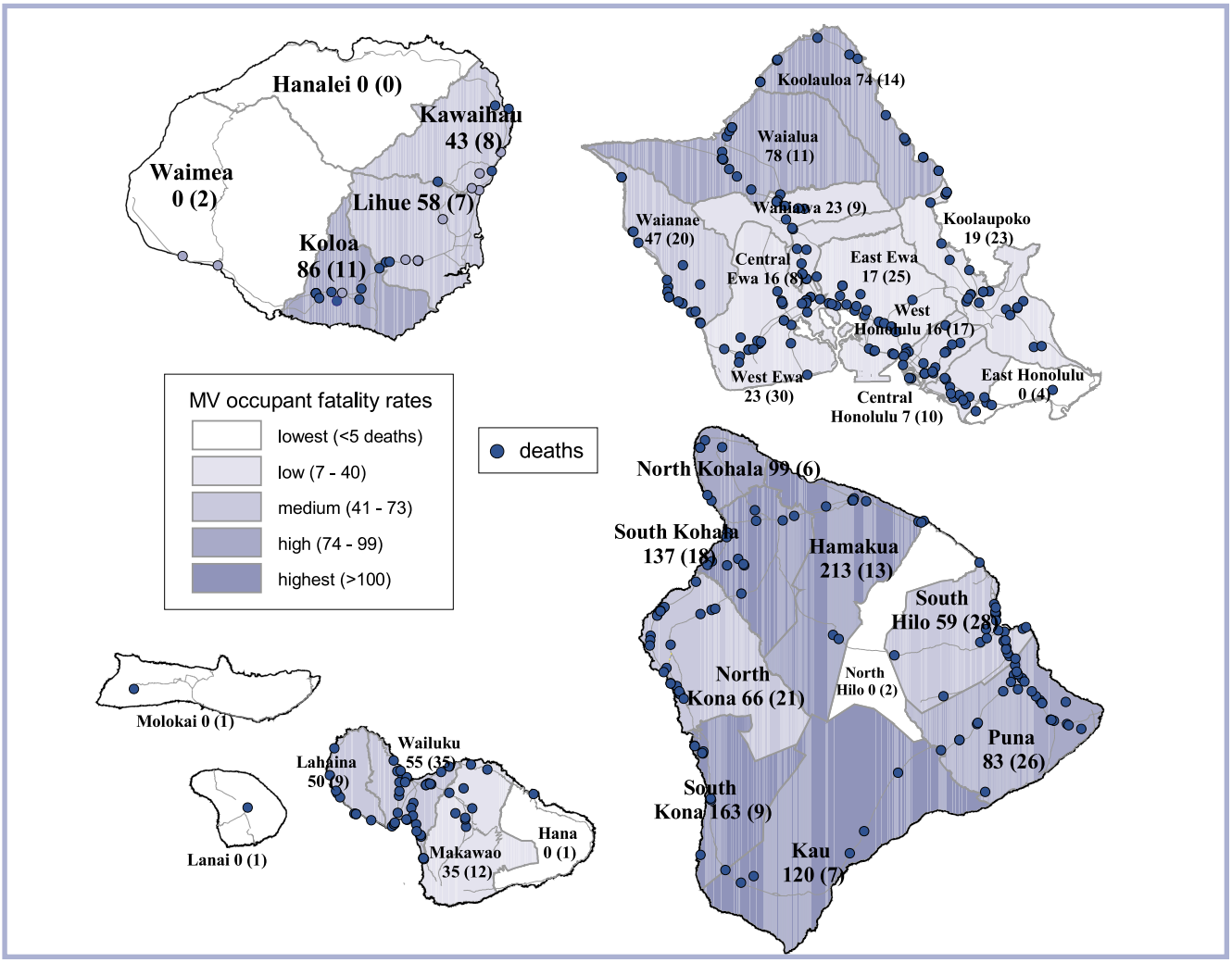
Drivers were significantly more likely to be restrained than passengers (53% vs. 30%). That difference is much greater if only backseat passengers are considered, as only 7% (2 of 29) of the backseat passengers were wearing seatbelts at the time of the crash. Restrained victims were significantly older than unrestrained victims (average age: 45 vs. 30 years). Seatbelt use was inversely associated with alcohol, as only 38% of the victims in alcohol-related crashes were restrained, compared to 53% of those in crashes not involving alcohol. This association was stronger when examined on the individual level, as only 32% of the drivers who had been drinking were restrained, compared to 62% of the drivers who had not been drinking.

More than one-third (40%, or 127 of 316) of the crashes linked to FARS records involved speeding, a proportion which showed no consistent trend over time. Speeding was significantly more common in crashes that involved alcohol (46%) than in those that did not (34%). Speeding was much more common in crashes on O‘ahu (53%) than on the Neighbor Islands (33% on Hawai‘i, 26% on Kaua‘i, and 22% on Maui).

Figure 29 shows the approximate locations of the deaths within each county, and the occupant fatality rate by district. Note, however, that these rates are based on small numbers of deaths in some cases and should be interpreted with caution. The 4 highest rates were computed for districts in Hawai‘i County: Hāmākua, South Kona, South Kohala and Ka'ū. North Kohala and Puna also had "high" rates, along with the Kōloa district of Kaua‘i, and the adjacent Waialua and Ko'olauloa districts on O‘ahu. Most of the districts in Maui County and the remainder of O‘ahu were in the "low" or "lowest" rate categories.

Figure 29. Fatality rates for motor vehicle occupants in Hawai‘i, by district, 1996-2000.

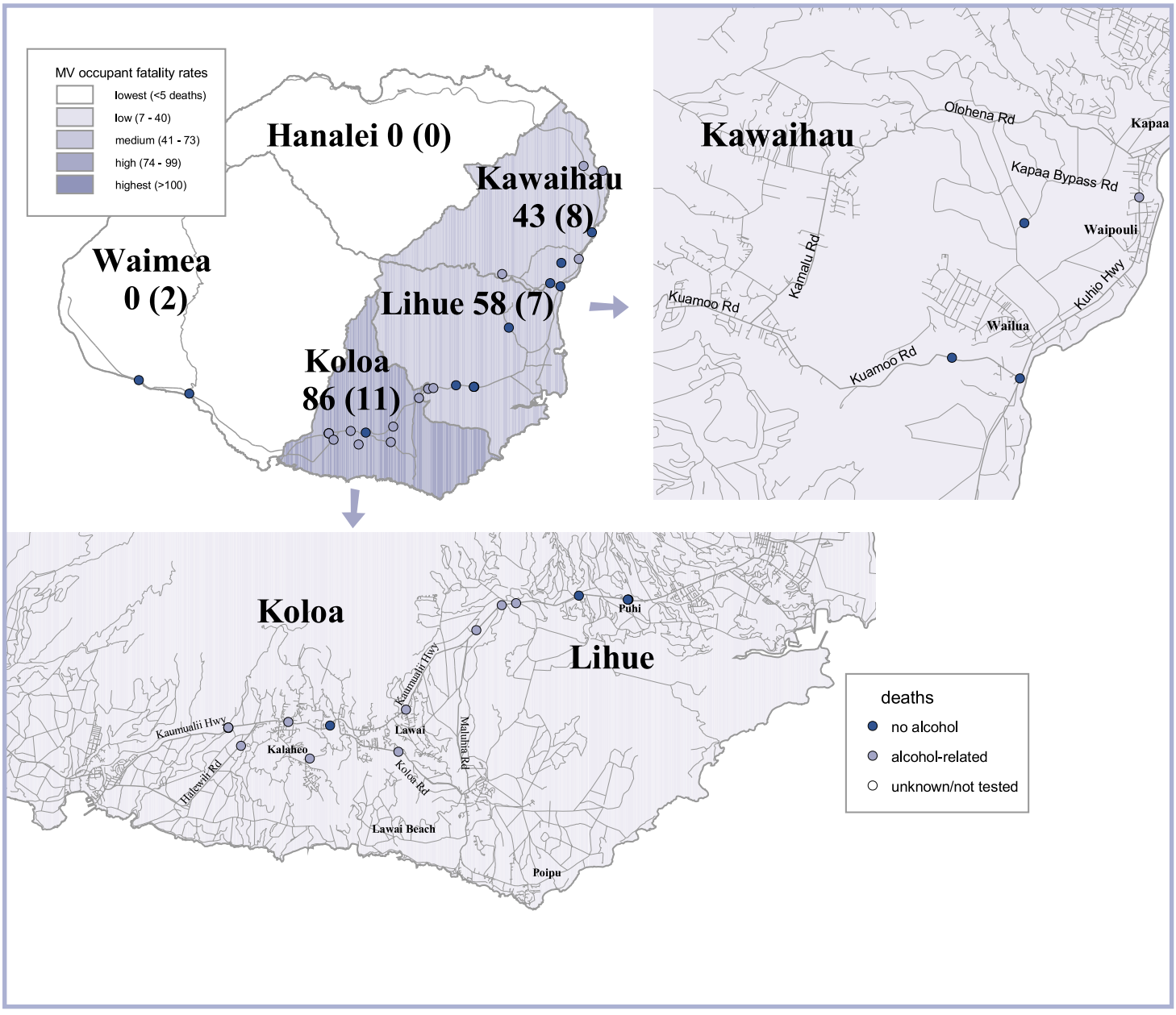
(Rate is per 100,000 residents, as estimated in 2000. Actual number of deaths is given in parentheses. Rates based on 20 or fewer deaths are unreliable and should be interpreted with caution.)



Almost all of the fatal crashes on Kaua‘i occurred along the east, south-east part of the island (Figure 30). (The approximate location of one crash could not be determined and is not shown on the map.) The Figure shows that a large proportion (16, or 57%) of the deaths were alcohol-related on this island. (For all maps, major roads are indicated in dark blue, and minor roads in lighter blue.) There were 11 deaths due to 8 crashes in the Kōloa district, including 4 deaths from a single crash on Kamuela’s Highway, west of Kalāheo. Seven of those crashes occurred in or near the areas of Kalāheo or Lāwa'i, including 4 along Kaumuali'i Highway. All but 1 of these 11 deaths in the Kōloa district were alcohol-related. There were 4 crashes along Kaumuali'i Highway in the Puhi area of Lihu'e district, including 1 crash that claimed 3 victims. Another cluster of 5 fatalities was seen in the Kapa'a/Wailua area of the Kawaihau district, including 3 along Kuamo'o Road.

Figure 30. Locations of crash fatalities on Kaua‘i, by alcohol status, 1996-2000.

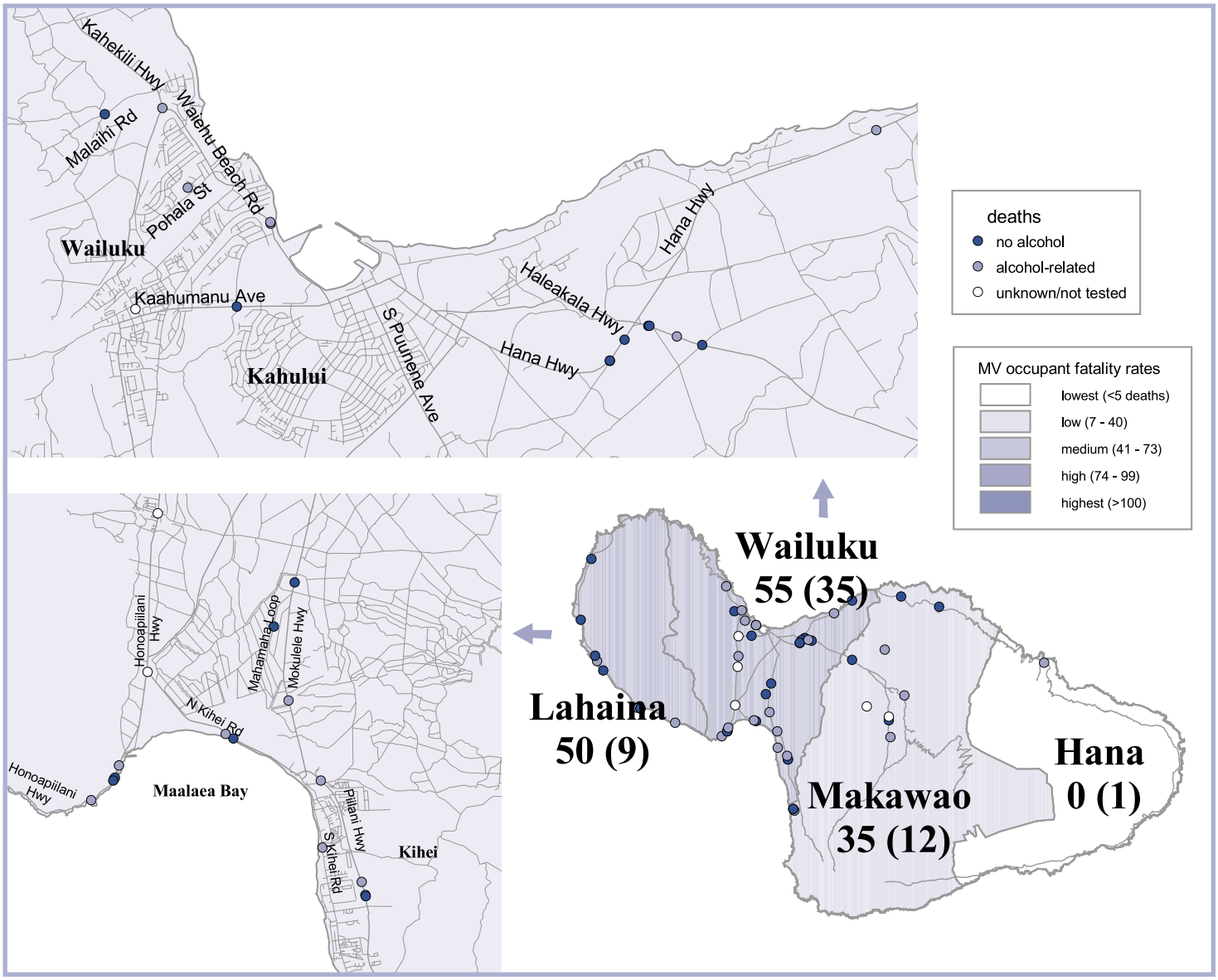
(Rate is per 100,000 residents, as estimated in 2000. Actual number of deaths is given in parentheses.)



Slightly fewer than half (24, or 42%) of the 57 deaths on the island of Maui were alcohol- related, and these crashes were distributed roughly equally around the island (Figure 31). There were 9 deaths due to 8 crashes along Honopi'ialani Highway, stretching from Olowalu to Kahana. Five of these crashes were head-on collisions, none of which involved alcohol. There were 5 deaths in the Kula area, including 3 on a short stretch of the Kula Highway. The upper inset in Figure 31 shows the 6 deaths that occurred in the urbanized areas of Wailuku. There was also a cluster of 7 deaths resulting from 6 crashes near the intersection of Haleakalā and Hāna highways. The lower-left inset shows 15 deaths in the area of Mā'alaea, southeast to North Kīhei. All but 2 of these deaths occurred along major roads and highways, including 4 along a short stretch of Pi'ilani Highway.

Figure 31. Locations of crash fatalities on Maui, by alcohol status, 1996-2000

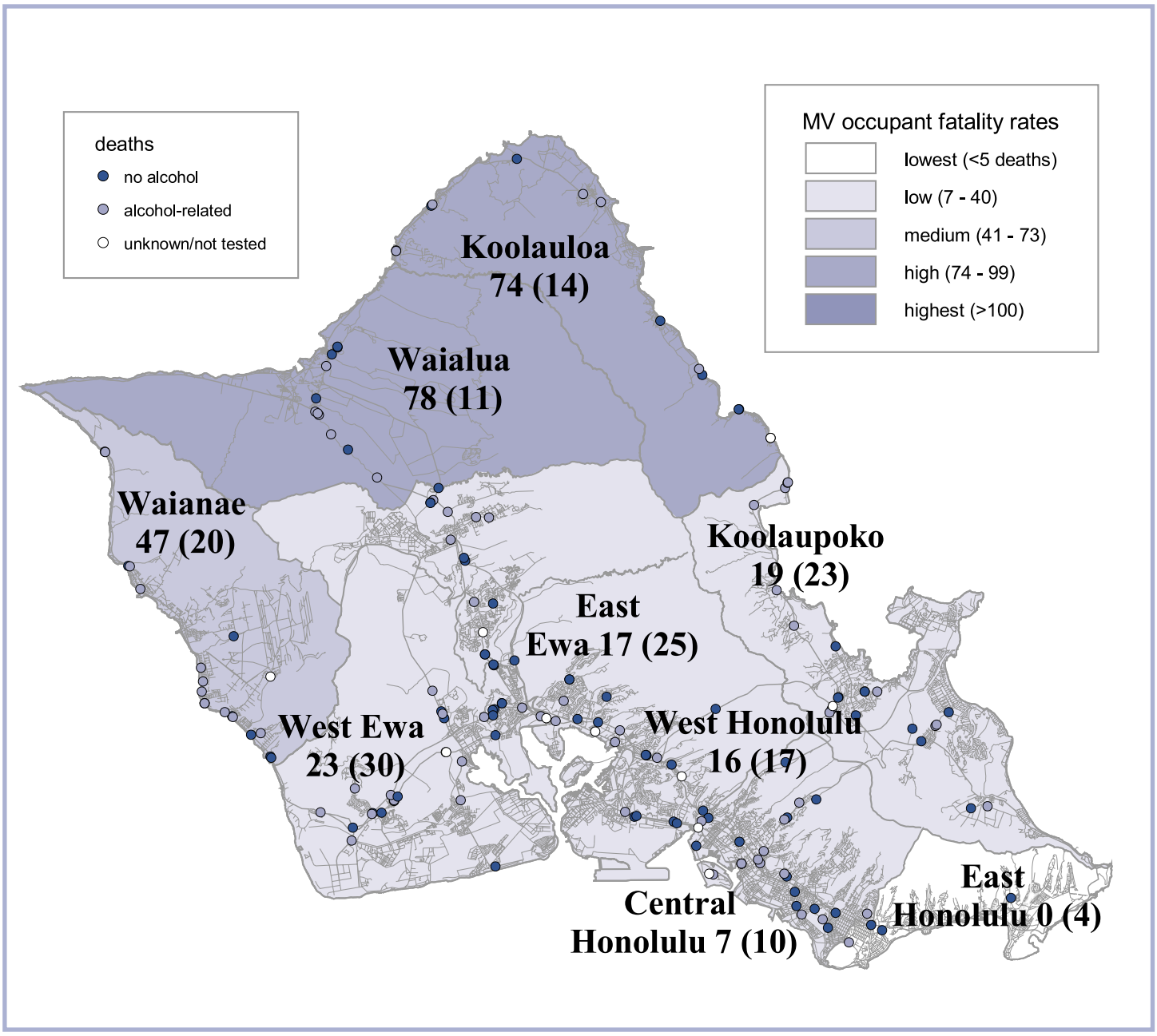
(Rate is per 100,000 residents, as estimated in 2000. Actual number of deaths is given in parentheses.)



Most of the O‘ahu districts had "low" occupant fatality rates, compared to the other islands (Figure 32). The exceptions were the Waialua and Ko'olauloa districts in the northern part of the island, and the Wai‘anae district. In general, most of the fatalities occurred along the major highways of the island. About half (81 of 172, or 47%) of the deaths were alcohol-related. This proportion was highest in the districts of Wai‘anae (65%), Wahiawā (56%), and Waialua (55%), and lowest in East 'Ewa (32%) and Central Honolulu (40%).

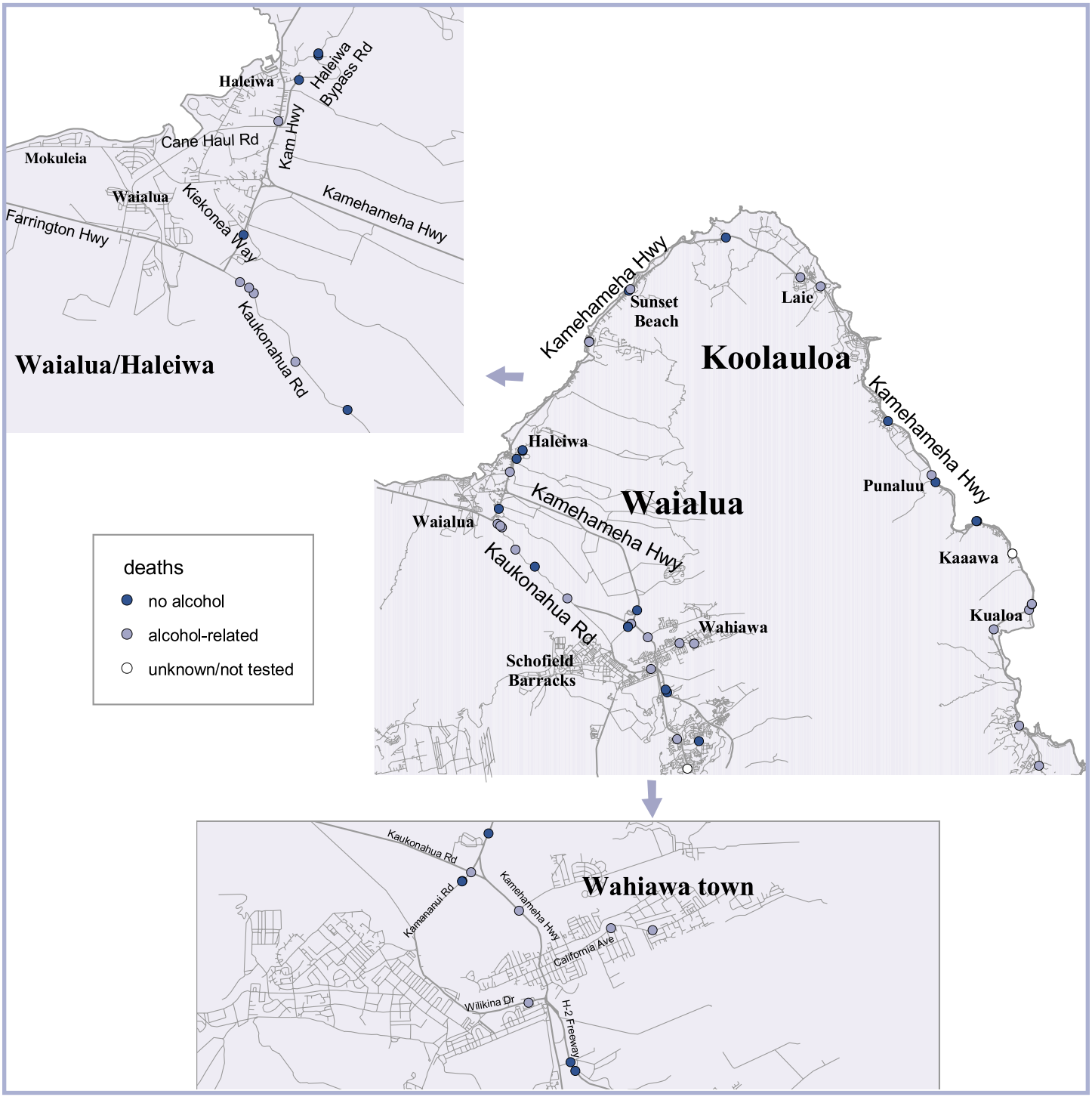
Figure 32. Locations of crash fatalities on O‘ahu, by district and alcohol status, 1996-2000.

(Rate is per 100,000 residents, as estimated in 2000. Actual number of deaths is given in parentheses.)



The 14 deaths in the Ko'olauloa district occurred over a long coastal stretch of the Kamehameha Highway, including 6 deaths due to 5 crashes in the Punalu'u to Ka'a'awa area (Figure 33). There were also 4 deaths due to 3 crashes in the Kualoa area in the adjoining district of Ko'olaupoko. There were 6 fatalities along Kaukonahua Road in the Waialua district, although there were none along the roughly parallel stretch of Kamehameha Highway to the north. All but 1 of those 6 fatalities were alcohol-related. There were 5 deaths in the urbanized areas of Waialua and Hale'iwa, only 1 of which was alcohol-related (left inset). Five of the 9 deaths in Wahiawā district involved alcohol, including most of those occurring in the Wahiawā town area (bottom inset).

Figure 33. Locations of crash fatalities in northern O'ahu, by alcohol status, 1996-2000.



Most of the deaths in the Wai‘anae district occurred along Farrington Highway (Figure 34), including 12 along a relatively short stretch between Mā‘ili and Nānākuli (right insert). Nine of those 12 deaths were alcohol-related. There was a cluster of 8 deaths (due to 6 crashes) on the H-1 Freeway and Farrington Highway road system near Kapolei (lower inset). Half (3) of those 6 crashes were alcohol-related, including that which involved 3 fatalities.

Figure 34. Locations of crash fatalities in western O‘ahu, by alcohol status, 1996-2000.

Most of the fatalities in the Pearl Harbor area occurred on the major roads, especially the H-1 Freeway and Kamehameha Highway (Figure 35), with some exceptions in Waipahu and Pearl City.

Figure 35. Locations of crash fatalities in the Pearl Harbor area, by alcohol status, 1996-2000.

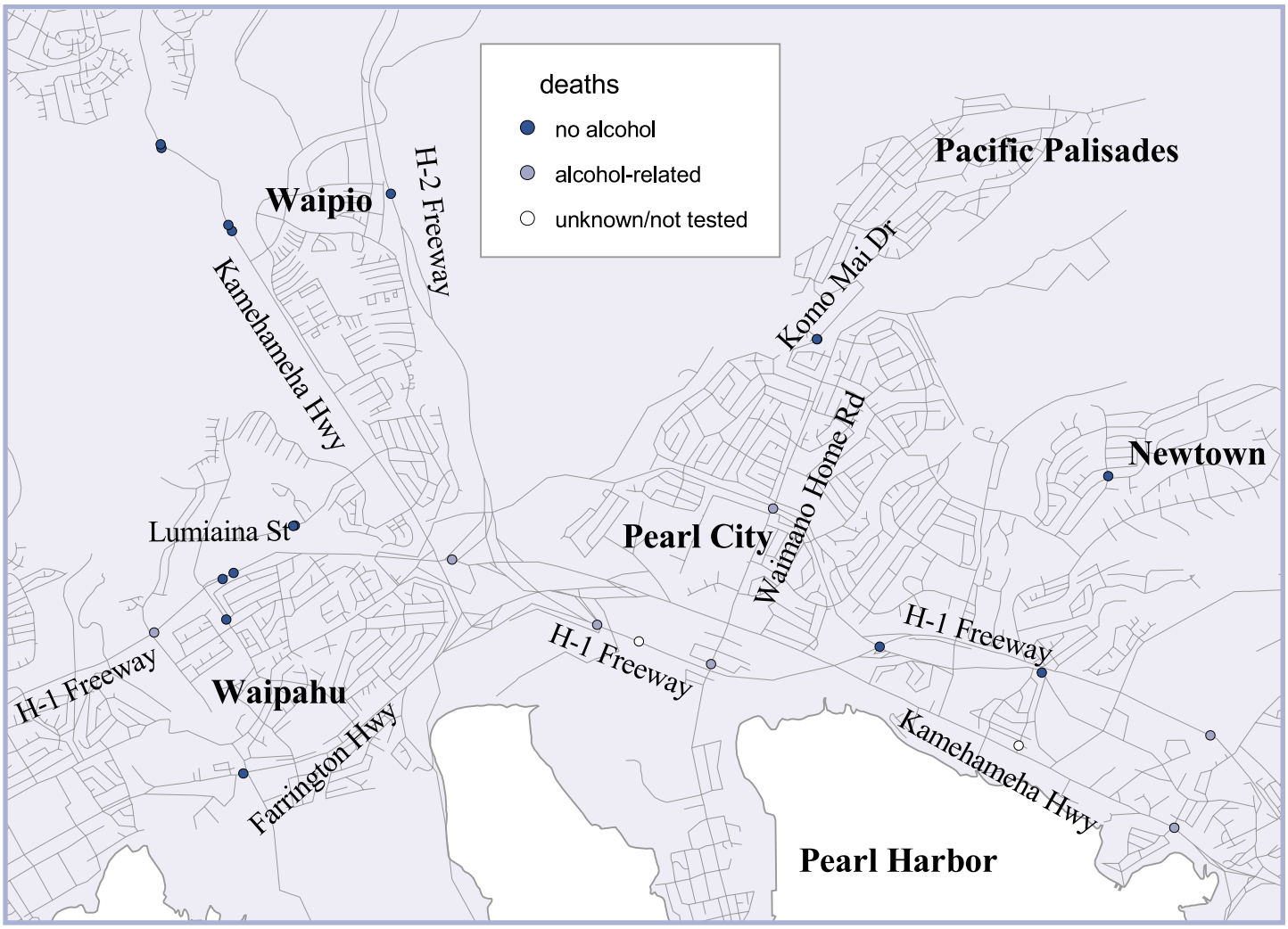
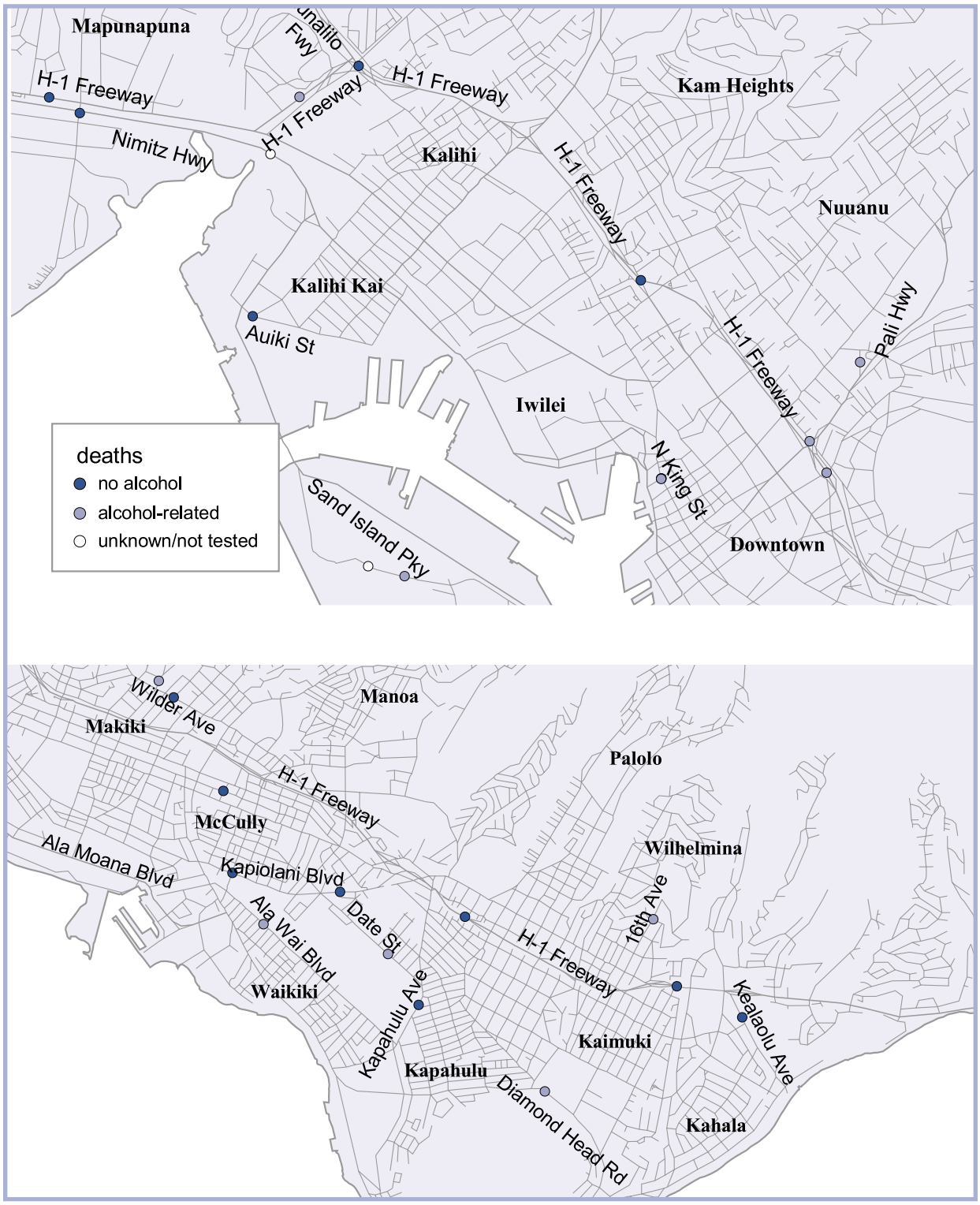


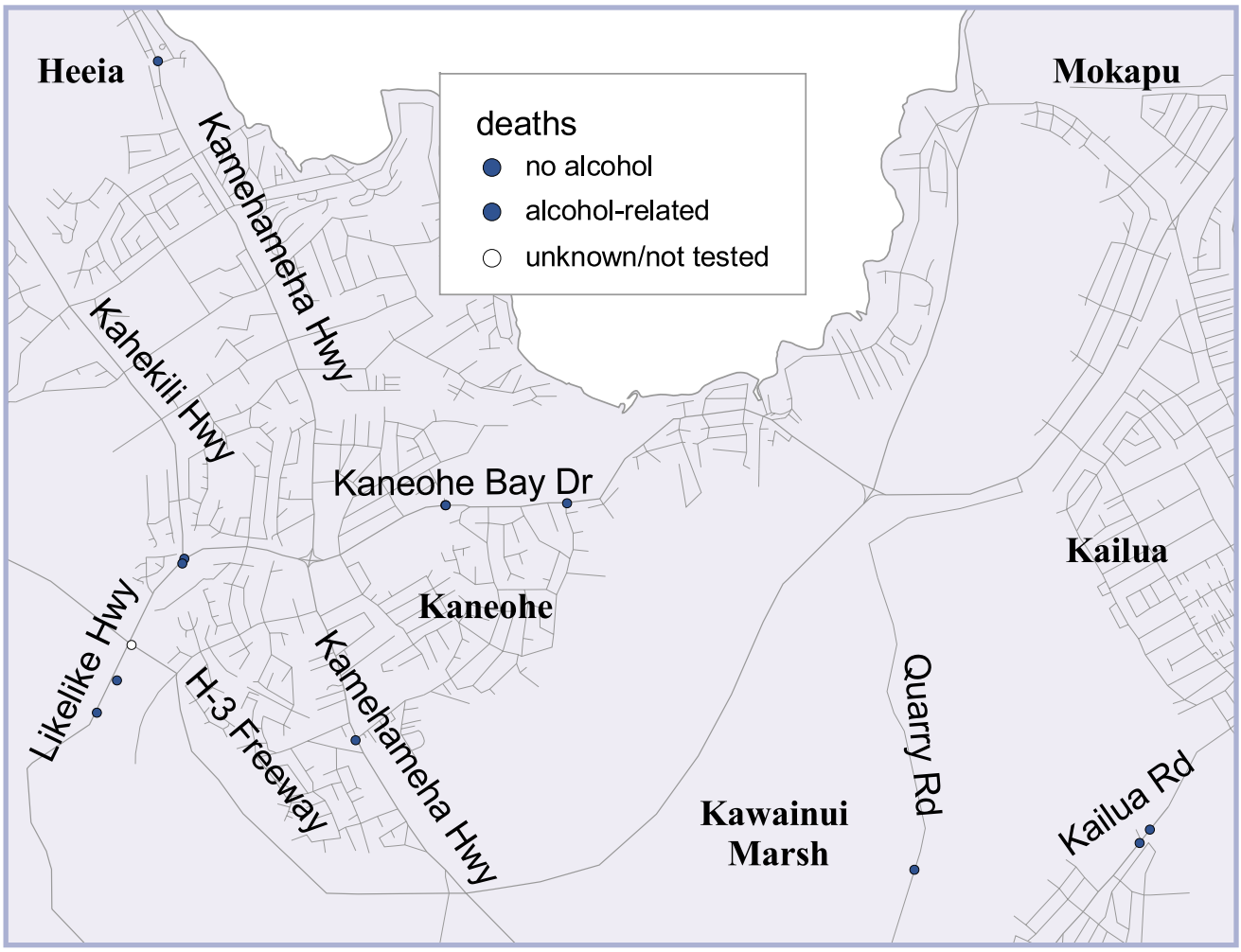
Figure 36 shows the crash deaths in the most urbanized parts of Honolulu. Most of the crashes in western Honolulu were along the major roadways, particularly at or near the H-1 Freeway/Lunalilo Freeway interchange area (top map). In contrast, only 2 of the 13 deaths in central Honolulu (bottom map) occurred on the H-1 Freeway. The rest were widely dispersed over many neighborhoods.

Figure 36. Locations of crash fatalities in western (top map) and eastern (bottom map) Honolulu, by alcohol status, 1996-2000.



All but 1 of the 14 deaths (due to 12 crashes) in the Kāneʻohe-Kailua area shown in Figure 37 were on major roads. There were 8 deaths along that stretch of the Likelike Highway (which later turns into Kāneʻohe Bay Drive), including 5 near the H-3 Freeway intersection.

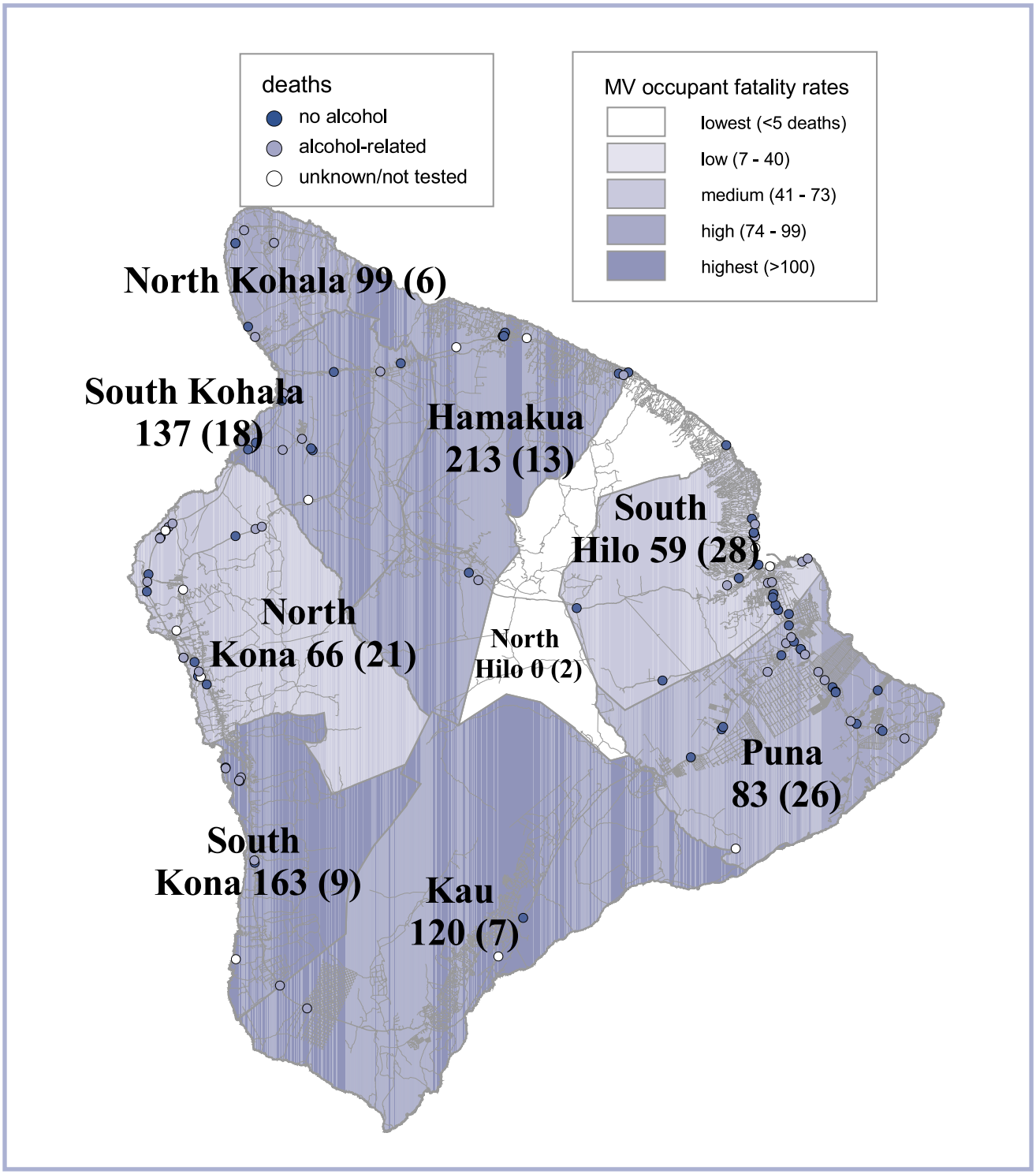
Figure 37. Locations of crash fatalities in Kāneʻohe/Kailua, by alcohol status, 1996-2000.



There were many districts on the island of Hawai‘i with "highest" or "high" occupant fatality rates (Figure 38). The urbanized districts of North Kona and South Hilo had "medium" rates, although the map shows high numbers of fatal crashes in these areas. Overall, fewer than half (42%, or 54) of the 130 fatalities were alcohol-related. However, that proportion varied greatly between districts, from the highest in Puna (58%), South Hilo (54%) and Hāmākua (54%), to the lowest in North Kona (24%), and South Kohala (28%).

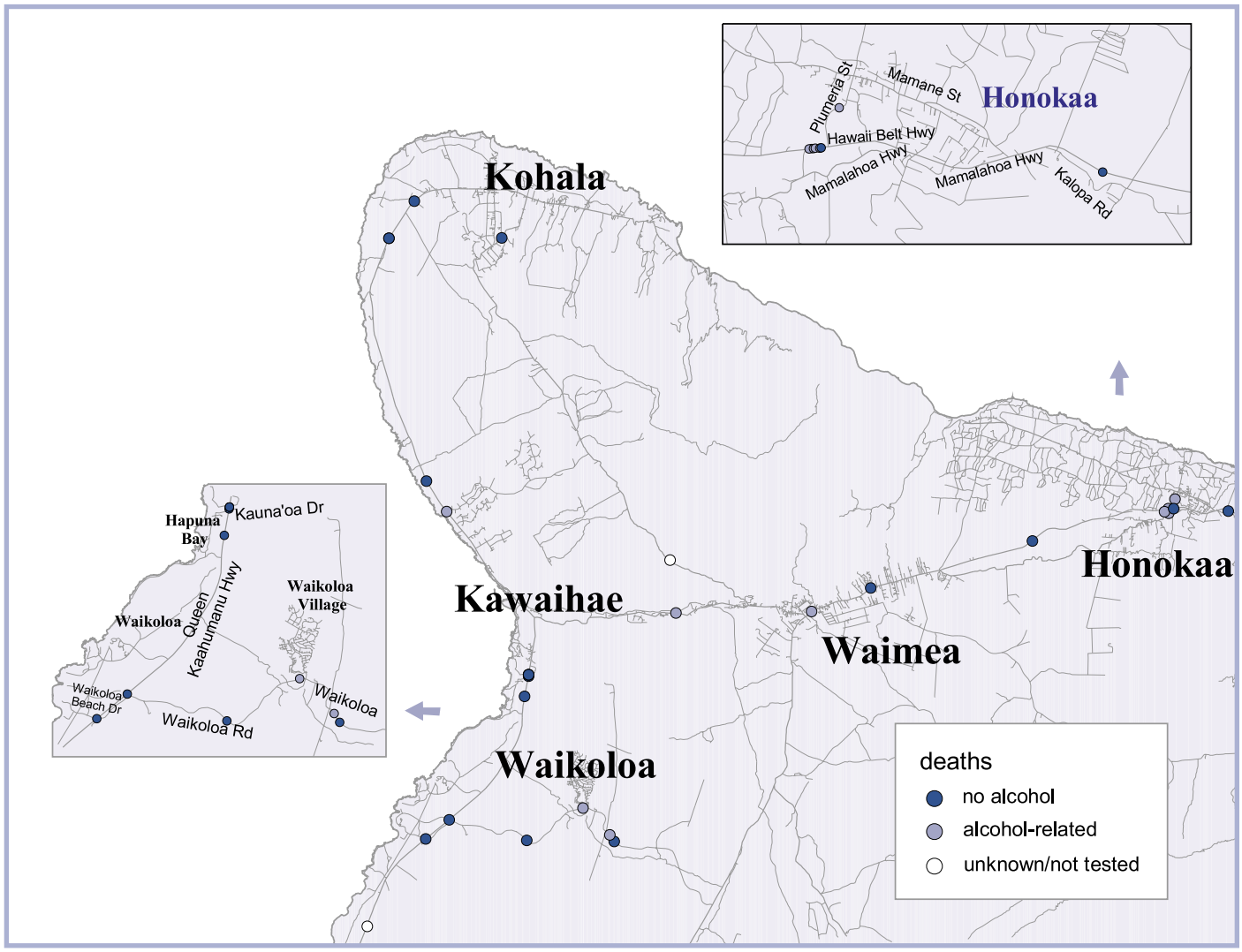
Figure 38. Locations of crash fatalities in Hawai‘i County, by district and alcohol status, 1996-2000.

(Rate is per 100,000 residents, as estimated in 2000. Actual number of deaths is given in parentheses.)



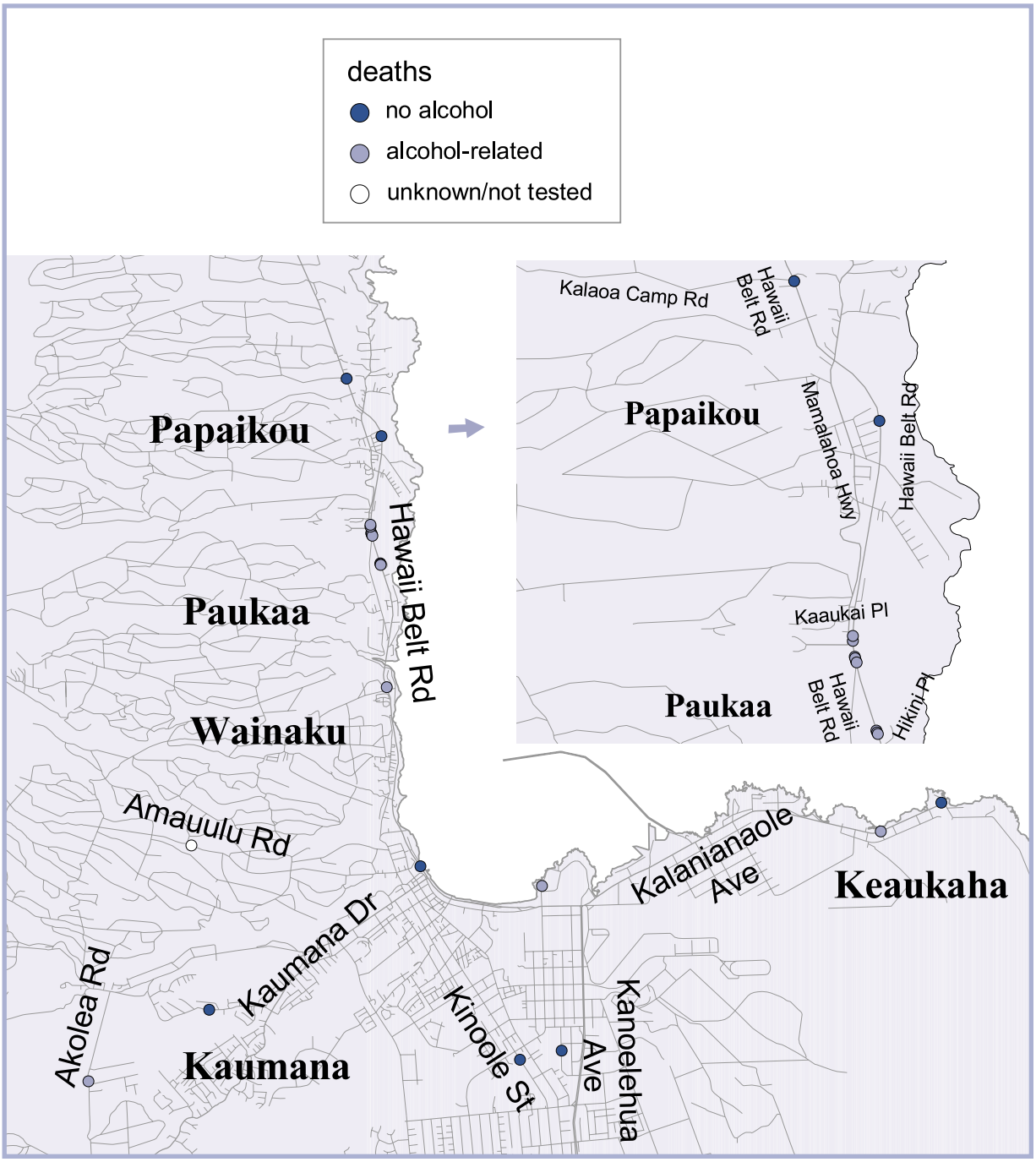
The fatal crashes in north Hawai‘i were widely dispersed, but there were 2 main clusters: Honoka‘a town and the Waikoloa area (Figure 39). There were 8 fatalities near the town of Honoka‘a, which resulted from four single victim crashes and a March, 1997 crash in which 4 people died. Four of these crashes were within 1 mile of the intersection between the Hawai‘i Belt Road (Route 19) and Plumeria Road (upper insert). There was 1 fatal crash there in each year between 1997 and 2000. Three of those 4 crashes involved only a single vehicle and a driver who was intoxicated. There were 11 deaths in the Waikoloa area, including 5 near Hāpuna Beach, resulting from 3 separate crashes. (One crash in July, 1997 claimed 3 victims.) There were 4 deaths in the vicinity of Waikoloa Village, along Waikoloa Road, and 2 others near the coastal resorts. Only 2 of these 11 deaths were alcohol-related. Both of the alcohol-related deaths were due to single vehicle crashes. Three of the remaining crashes were head-on collisions, and 3 others were "angle" collisions.

Figure 39. Locations of crash fatalities in northwestern Hawai‘i, by alcohol status, 1996-2000.



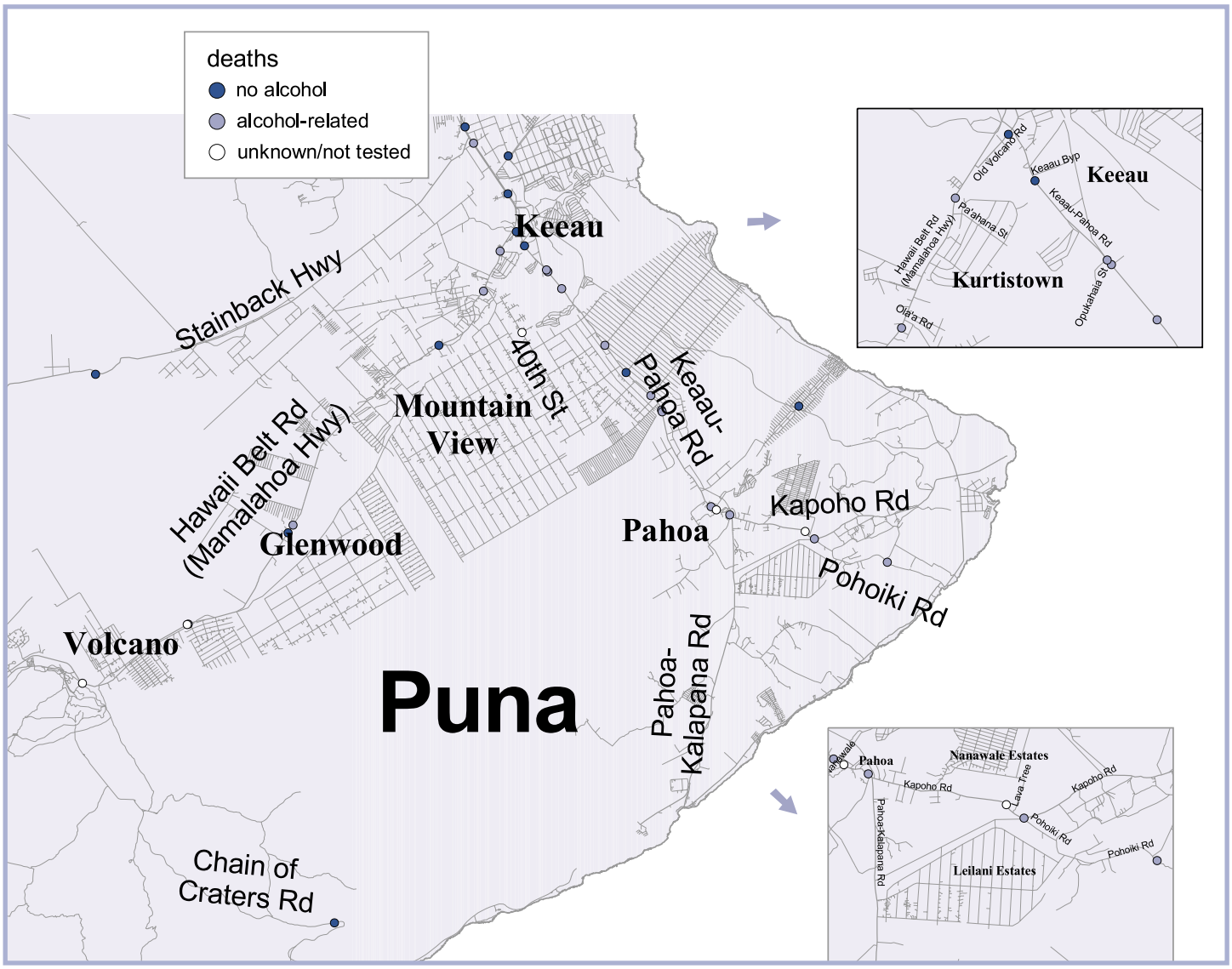
The 9 crashes in the Hilo town area were widely dispersed (Figure 40), but there was a cluster of deaths along Hawai‘i Belt Road to the north of town (right insert). Nine fatalities resulted from 3 separate crashes at or near milepost 6 on Hawai‘i Belt Road (near Hikini Place), in the Pāpa‘ikou area: killing 4 people in February of 1996, 3 people in August of 1996, and 2 in a November 1999 head-on collision. All 3 crashes involved intoxicated drivers. Two other crashes in the area claimed 2 other victims.

Figure 40. Locations of crash fatalities in Hilo and vicinity, by alcohol status, 1996-2000.



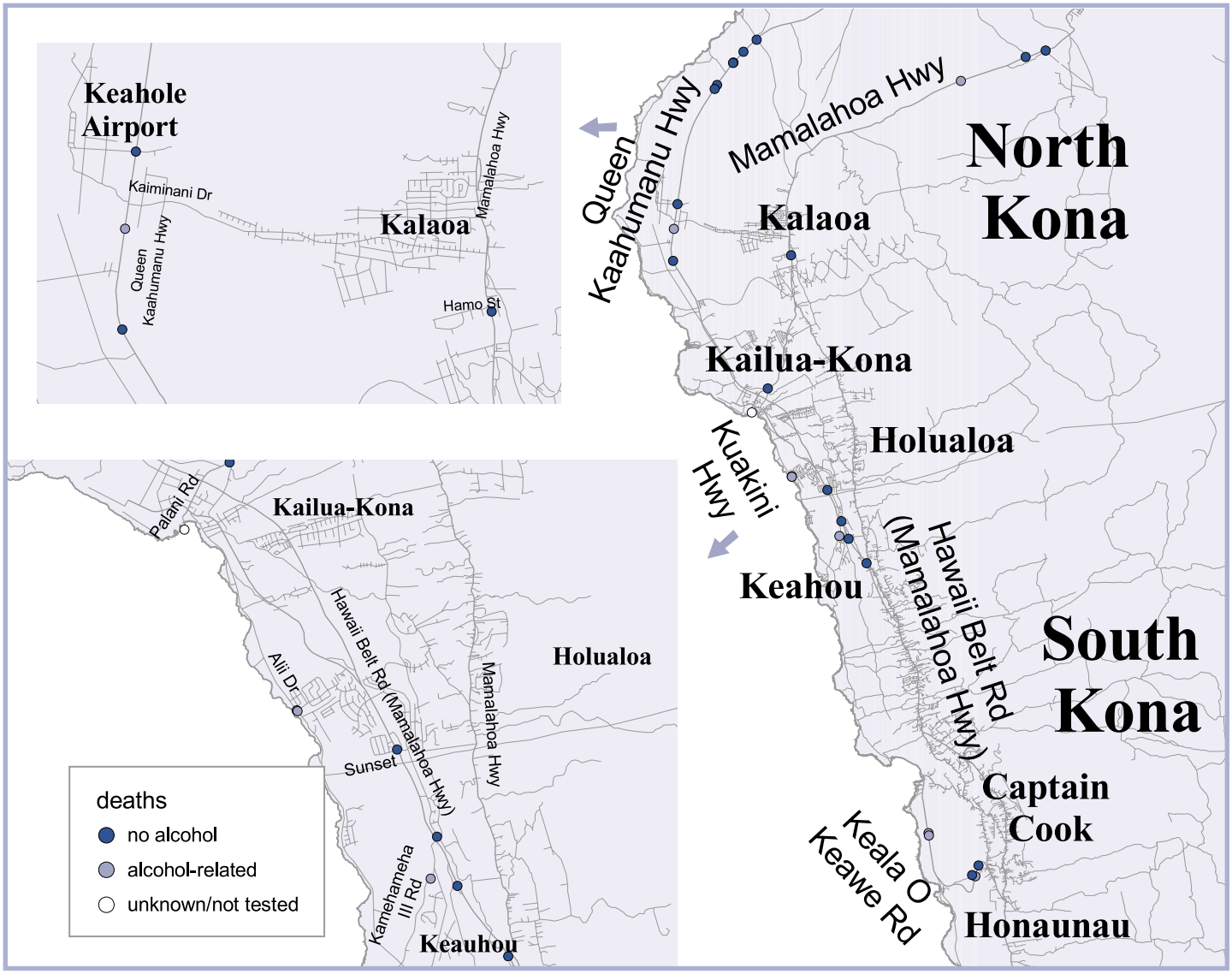
There were 11 deaths due to 10 crashes in the general vicinity of Kea‘au in the Puna district (Figure 41), and all but 1 occurred along the main roads of Hawai‘i Belt Road (route 11) or Kea‘au-Pāhoa Road (route 130). There were another 5 deaths further south down Kea‘au-Pāhoa Road, and 3 more near the town of Pāhoa. Almost all of the deaths south of Kea‘au were alcohol-related. The crashes along Kea‘au-Pāhoa Road were fairly equally distributed between single car crashes, head-on collisions and angle collisions. There were 5 deaths due to 4 crashes along the stretch of Hawai‘i Belt Road from Mountain View to Volcano.

Figure 41. Locations of crash fatalities in the Puna district, by alcohol status, 1996-2000.



There were 13 deaths (due to 12 crashes) in the sparsely populated area north of Kailua-Kona, including Kalaloa and the area immediately north (Figure 42, and top insert). Nine of those deaths occurred along Queen Ka'ahumanu Highway, and the remaining 4 were on the parallel stretch of M_malahoa Highway. Only 2 of those 12 deaths were alcohol-related. There were 7 single car crashes; only 2 were known to be head-on collisions. The nine deaths (due to 8 crashes) in the Kailua-Kona area were fairly widely distributed. Half (4) of these crashes involved a single vehicle, including 1 crash that involved alcohol. Five deaths resulted from 3 crashes in the H_naunau area, including 2 crashes on Keala O Keawe Road. All were single vehicle crashes, and 2 involved inebriated drivers.

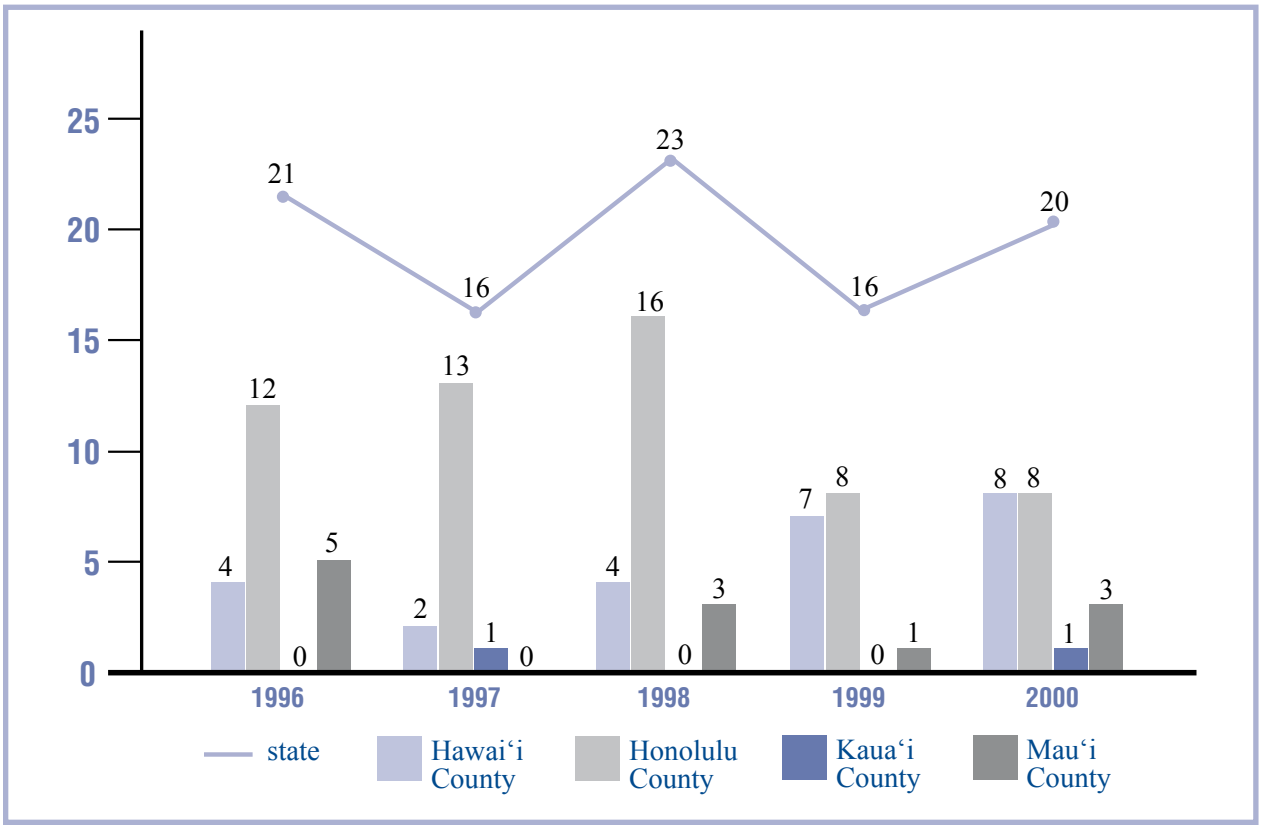
Figure 42. Locations of crash fatalities in Kailua-Kona and vicinity, by alcohol status, 1996-2000.



Motorcyclists:

Deaths among motorcyclists were the 7th leading cause of fatal unintentional injuries in the state, accounting for 96 total deaths from 1996 to 2000. Figure 43 shows there were anywhere from 16 to 23 such fatalities each year, with no apparent trend over time. The 96 fatalities resulted from 95 crashes, as only 1 crash involved more than 1 victim. Only 2 of the victims were passengers; the rest were drivers of the motorcycle. (This status was not known for 3 of the victims.) More than a quarter (26%, or 25) of the victims were killed in Hawai‘i County, although only 12% of the population resides there and only 14% of the registered motorcycles are registered in this county.

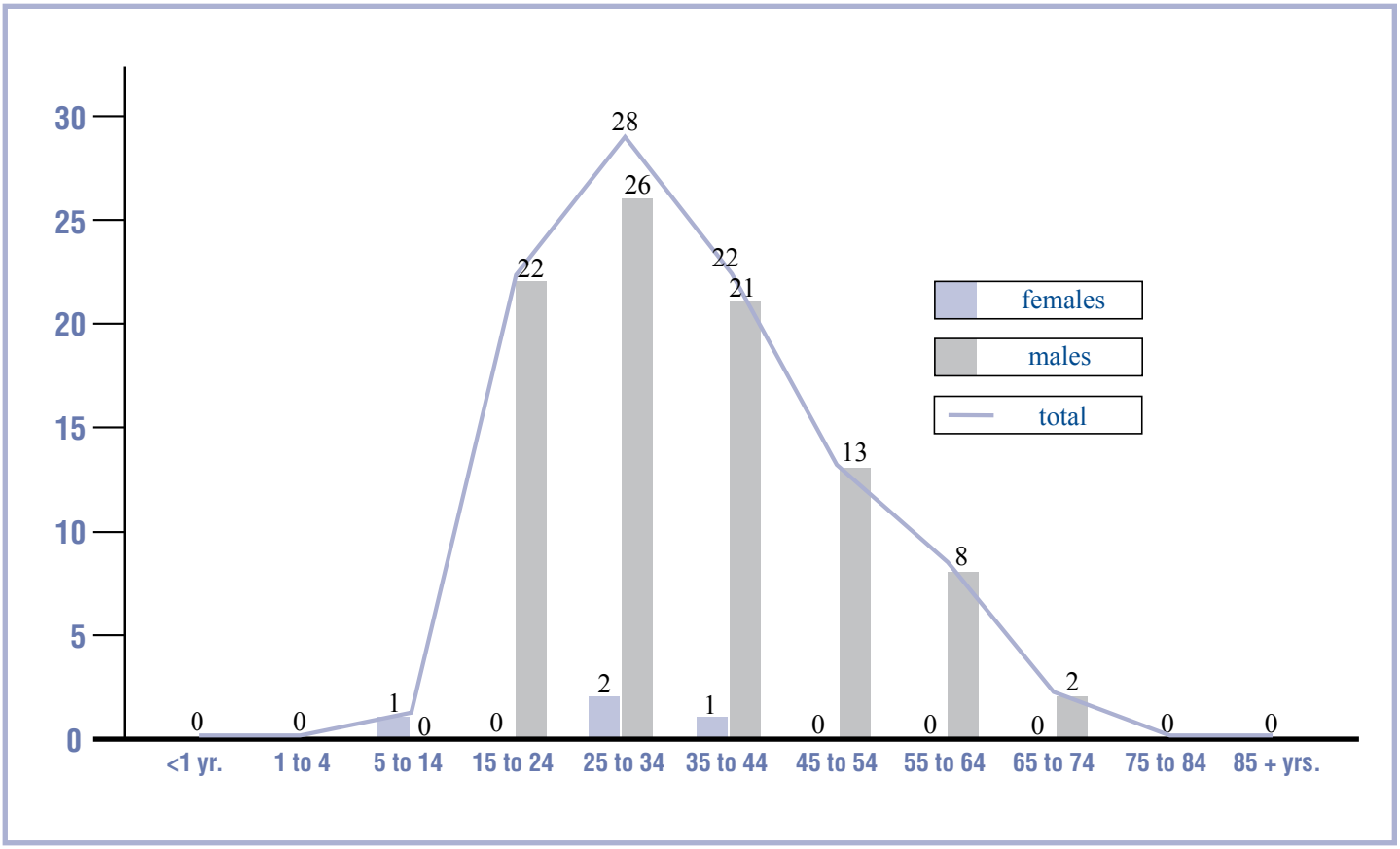
Figure 43. Annual number of fatally injured motorcyclists in Hawai‘i, by county, 1996-2000.



More than a quarter (26%, or 25) of the motorcyclists were killed in Hawai‘i County, although only 12% of the population resides there and only 14% of the registered motorcycles are registered in this county.

Figure 44 shows that these victims were generally young to middle-aged adults. All but 3 of the 96 victims (97%) were between the ages of 15 and 64 years. Three-fourths (75%, or 72) were between 15 and 44 years of age. Only 4 of the victims (4%) were females, including the 2 victims who were not drivers.

Figure 44. Age and gender distribution of fatally injured motorcyclists in Hawai'i, 1996-2000.

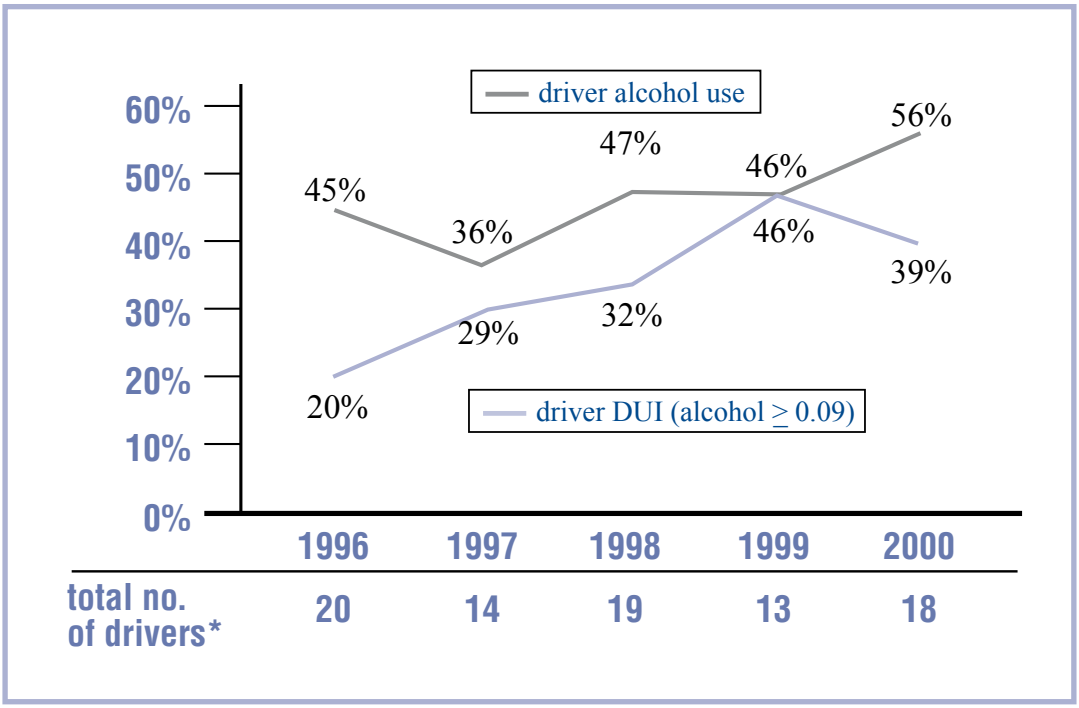


The HIDS data was merged with FARS data to provide more information on risk factors such as motorcycle helmet usage among victims, and alcohol involvement in the crash. All but 9 of the 96 (91%) fatalities were matched to FARS records, and alcohol use was determined for all but 1 of the 85 drivers linked to FARS records.

Over the entire 5-year period, 32% (27) of the 84 drivers were intoxicated (blood alcohol concentration (BAC) >0.09 g/dl), and 46% (39) were reported to have some level of alcohol in their blood at the time of death. Alcohol use was higher among motorcycle drivers killed in the Neighbor Islands (20 of 37, or 54%), compared to those killed on O'ahu (19 of 47, or 40%), but not to a statistically significant degree.

Figure 45 shows that alcohol use by the drivers generally increased over the 5 years, particularly when considering levels that exceeded the standard for intoxication (0.09 g/dl). For example, 4 of the 20 (20%) victims in 1996 had a BAC of 0.09 g/dl or more, and this proportion increased dramatically by 1999 (46%, or 6 of 13 drivers) and 2000 (39%, or 7 of 18). The trend for any of alcohol involvement (including levels below 0.09) was less consistent, but a minimum of at least 1 in every 3 (36% in 1997) of these deaths involved alcohol.

Figure 45. Alcohol use (percent) among motorcycle drivers* killed in Hawai'i, by year, 1996-2000.



**Does not include at least 7 drivers who could not be linked to FARS records (1 each in 1996, 1998, and 1999; 2 in 1997 and 2000), and 1 driver killed in 1998 for whom the alcohol level was not assessed.*

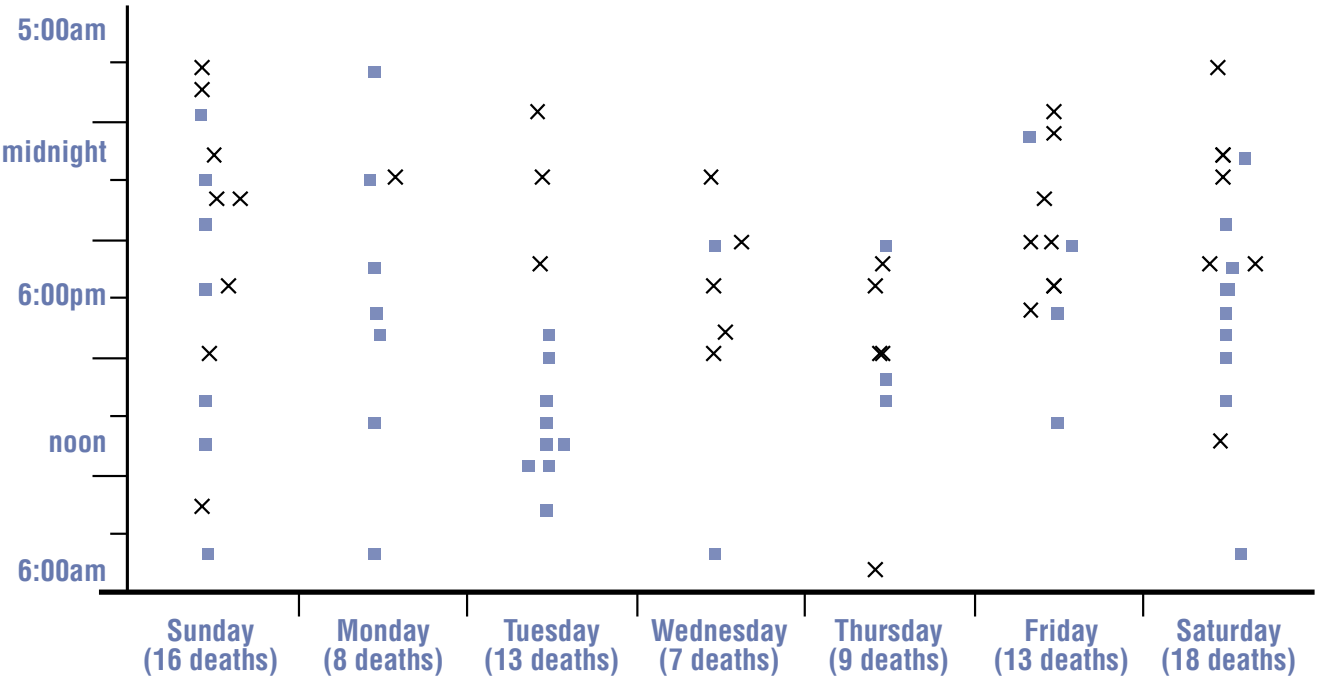
Alcohol involvement in these deaths was even greater, considering 8 of the motorcycle drivers who had not been drinking collided with automobile drivers who had been drinking. (Six of those automobile drivers had reported BAC levels of 0.09 g/dl or more, and 2 had lower BAC levels.) Overall, more than one-third of these crashes (39%, or 33) involved a drunk driver, and more than half (56%, or 47) involved a driver who had been drinking. (These calculations exclude the 9 crashes which could not be linked to FARS data.) The annual trends for this type of alcohol involvement in a crash varied inconsistently.

Only 1 in every 5 (20%, or 17 of 85 victims linked to FARS data) of the victims were wearing a helmet at the time of the crash. That proportion varied inconsistently between 8% in 1999 and 36% in 1997. Helmet use was nearly the same for crashes on O'ahu (21%) and the Neighbor Islands (19%). Helmet use was higher among the non-drinkers (24%, or 11 of 45), compared to those who had consumed alcohol (16%, or 6 of 37), but this was not a statistically significant difference. There were also no significant relationships between the age of the victim and either helmet or alcohol use, although these comparisons were limited by the small sample sizes.

There was no particular time of year in which these crashes occurred, as there were 5 to 8 in all but 3 months: 3 in March, 10 in June, and 14 in November. This is in contrast to the rest of the United States, where approximately 40% of fatal motorcycle crashes occur during the period of June through August. Since other temporal characteristics (time and day of the week) were available only for the 85 motorcycle drivers linked to FARS records, the following discussion pertains only to them. Weekends were the most common days for these crashes, as 40% of the drivers crashed on a Saturday (18) or Sunday (16) (Figure 46). One third (33%, or 27) of the drivers crashed during 7:00 pm to 11:00 pm period. As expected, nighttime crashes were associated with alcohol use as the majority (30 of 46, or 65%) of drivers who crashed between 7:00 p.m. and 5:00 a.m. In contrast, only 24% (9 of 38) of the drivers who crashed between 6:00 a.m. and 6:00 p.m. had been drinking. There were no clear associations between alcohol use and the day of the week on which the crash occurred.

Figure 46. Temporal characteristics of fatal motorcycle crashes in Hawai'i, by alcohol status of drivers, 1996-2000.

(Vertical axis shows time of day of crash, horizontal axis shows day of week. Drivers who had been drinking are indicated by "x", non-drinkers by squares.)



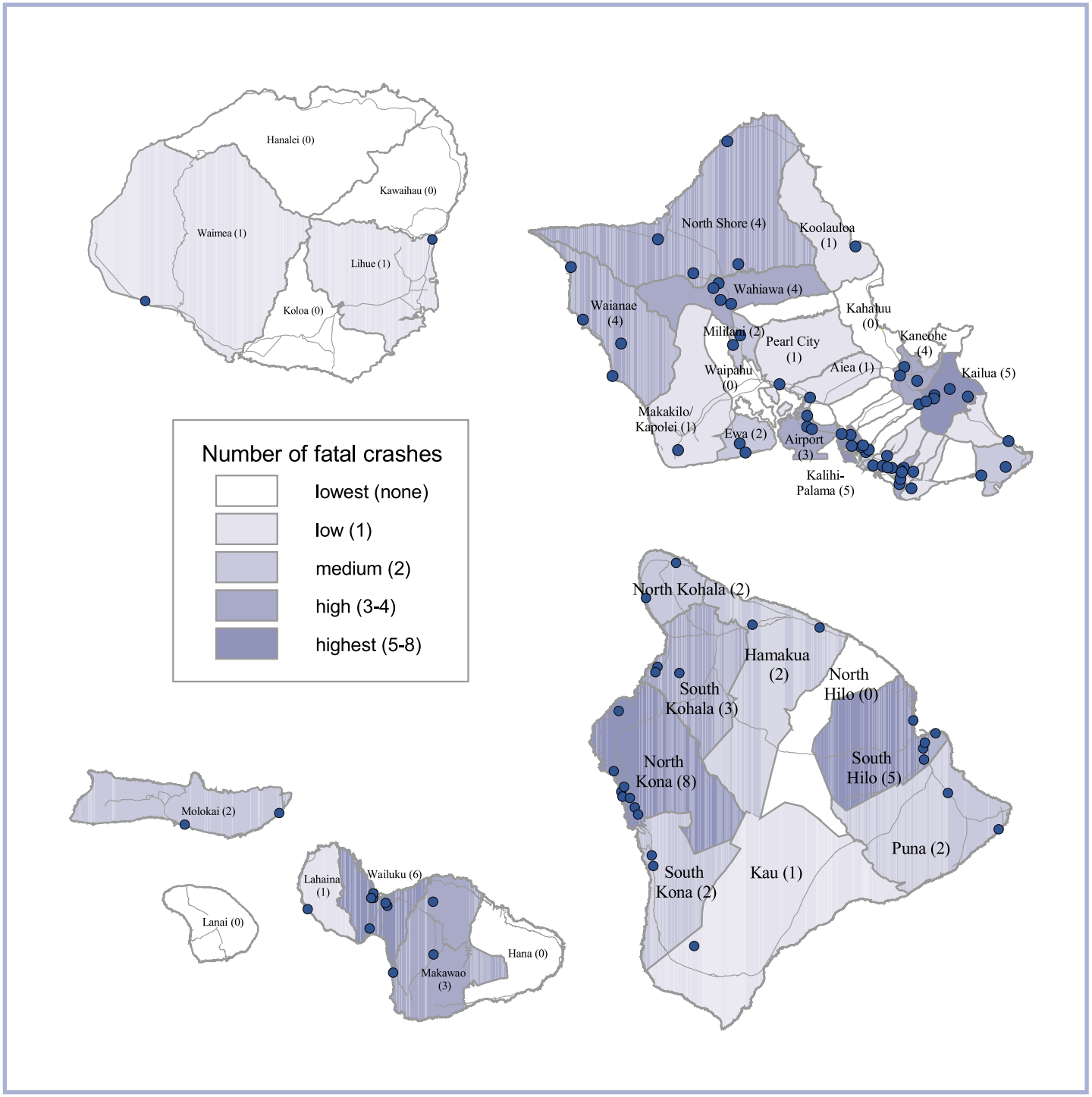
Does not include 1 driver for whom drinking status was not known.

A large proportion of the crashes (42%, or 36 of 85) did not involve another motor vehicle and were presumably due to either loss of control of the motorcycle or collision with non-vehiclular objects. There were no significant relationships between the type of crash and the time of crash, age of driver, or even use of alcohol.

Speeding was a major risk factor in these crashes, as 41% (35) of the drivers were reported to be "driving too fast for conditions or in excess of posted speed limit". The speeders were significantly younger than the non-speeders (average age: 29 vs. 40 years, respectively). Speeding was also more prevalent among victims who crashed on O'ahu (52%), compared to those on the Neighbor Islands (27%). However, speeding was not related to drinking, helmet use, or type of crash. Including speeding, nearly two-thirds of the 85 drivers (64%, or 54) made an error which contributed to the crash. Most commonly, 21 drivers failed to keep in their proper lane, and 8 others were described as "inattentive". Among the 54 drivers of the other vehicles that collided with and fatally injured the motorcyclists (FARS matches only), more than half (57%, or 31) made an error which contributed to the crash. The most common error was failure to yield to the motorcyclist (24). Nine drivers were "inattentive", 7 were speeding, and 5 failed to stay in their proper lane. Of the 54 deaths that involved a collision with another vehicle, 54% (29) involved errors by the fatally injured motorcyclist, 57% (31) by the other driver, and 36% (14) by both parties.

Figure 47 shows the approximate geographic location of the fatal motorcycle crashes. There were 4 crashes in each of 3 northwestern districts of O'ahu: Wai'anae, North Shore and Wahiawā. Kailua and Kalihi-Pālama also had high totals. (These are seen more clearly in the expanded map shown in Figure 51.) There were 6 crashes in the Wailuku district of Maui, including 5 in the urbanized area of Kahului-Wailuku. The highest district total, however, was seen in North Kona where there were 8 crashes, all but 1 in the urbanized stretch of Kailua-Kona. There were 5 crashes in South Hilo with most occurring in the Hilo town area.

Figure 47. Fatal motorcycle crashes in Hawai'i, by island and district, 1996-2000.

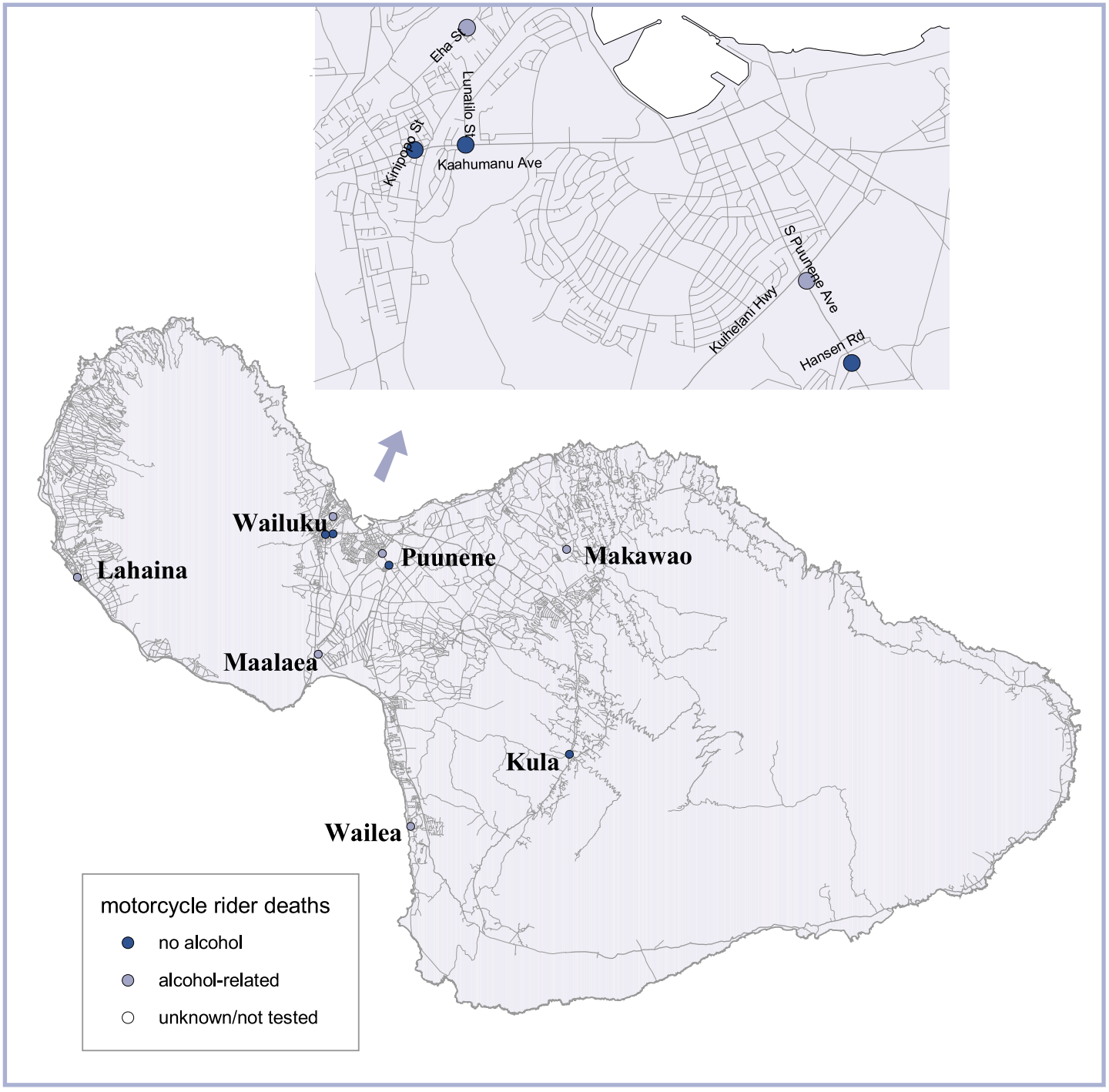


At least 60% (15) of the 25 fatal motorcycle crashes in Hawai‘i County involved alcohol: 14 motorcyclists had been drinking (12 reportedly intoxicated), and 1 was hit by a drunk driver. (Alcohol status was unknown for the other 2 crashes, which could not be linked to FARS records). About half (48%, or 12 of 25) of the crashes occurred in the urbanized areas of Kailua-Kona (7 crashes) or Hilo (5) (Figure 48). Four of the 7 motorcyclists killed in the Kailua-Kona area were intoxicated. Most of the crashes occurred along Hawai‘i Belt Road (Route 11) or its continuation, Queen Ka‘ahumanu Highway. Most of the remaining 13 crashes were widely distributed around the island, although there were 3 in the Waikoloa area. All of the crashes in the northern parts of the island were alcohol-related.

Figure 48. Locations of motorcycle crash fatalities in Hawai‘i County, by alcohol status, 1996-2000.

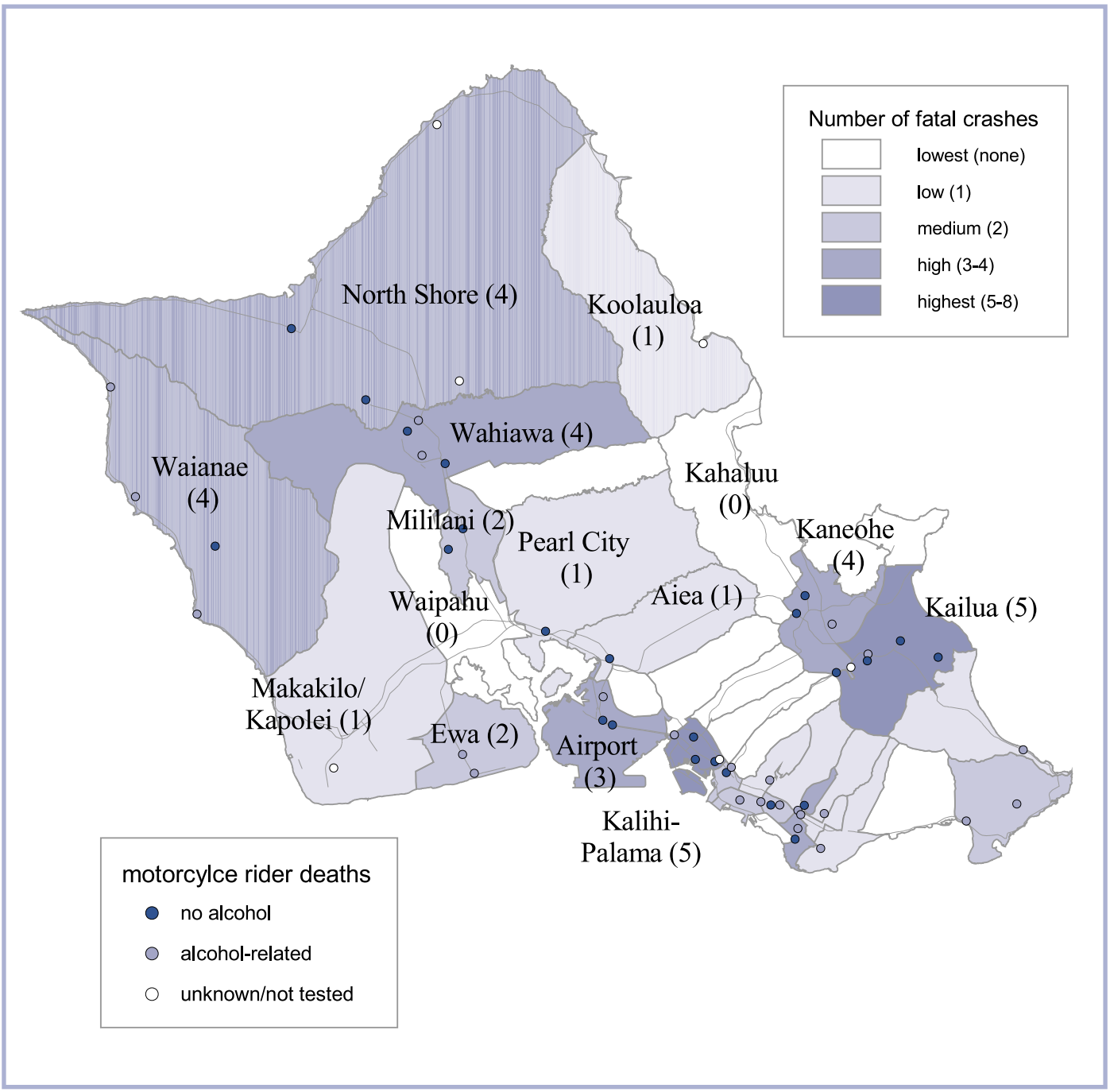
The majority (60%, or 6 of 10) of motorcycle crashes in Maui County also involved alcohol. Only 3 motorcyclists had been drinking, however; 3 others were hit by drunk drivers. Half of the crashes (5) were in the Kahului area, and the rest were widely dispersed around the other more rural parts of the island. All but 1 of the 5 crashes outside of the Kahului area were alcohol-related. Four of the 5 crashes in the Kahului area occurred on major roads, including 2 on Ka‘ahumanu Avenue and 2 on S. Pu‘unēnē Avenue. Only 1 rider was speeding at the time of the crash.

Figure 49. Locations of motorcycle crash fatalities in Maui County, by alcohol status, 1996-2000.



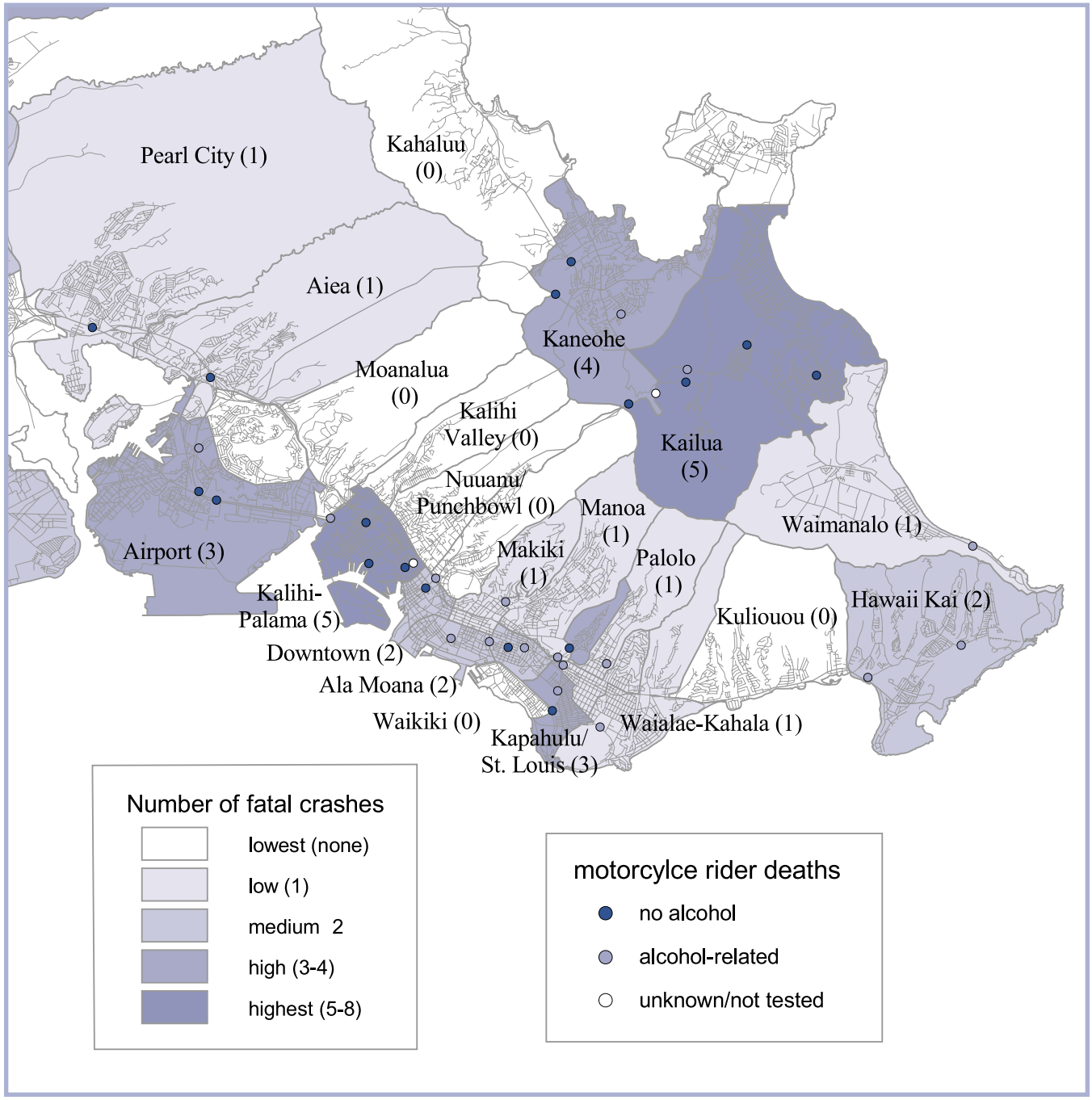
About half (26 of 55) of the fatal motorcycle crashes on O‘ahu occurred in 6 neighborhood boards: Kalihi-Pālama, Kailua, Kāne‘ohe, Wai‘anae, Wahiawā and North Shore (Figure 50). Of the 50 crashes on O‘ahu that could be linked to FARS, about half (24) were alcohol-related. Eleven motorcyclists were inebriated, and another 8 had lower levels of alcohol in their blood. Alcohol was more commonly involved in crashes in Wai‘anae (3 of 4) and those east of Diamond Head (5 of 5).

Figure 50. Fatal motorcycle crashes on O‘ahu, by neighborhood and alcohol involvement, 1996-2000.



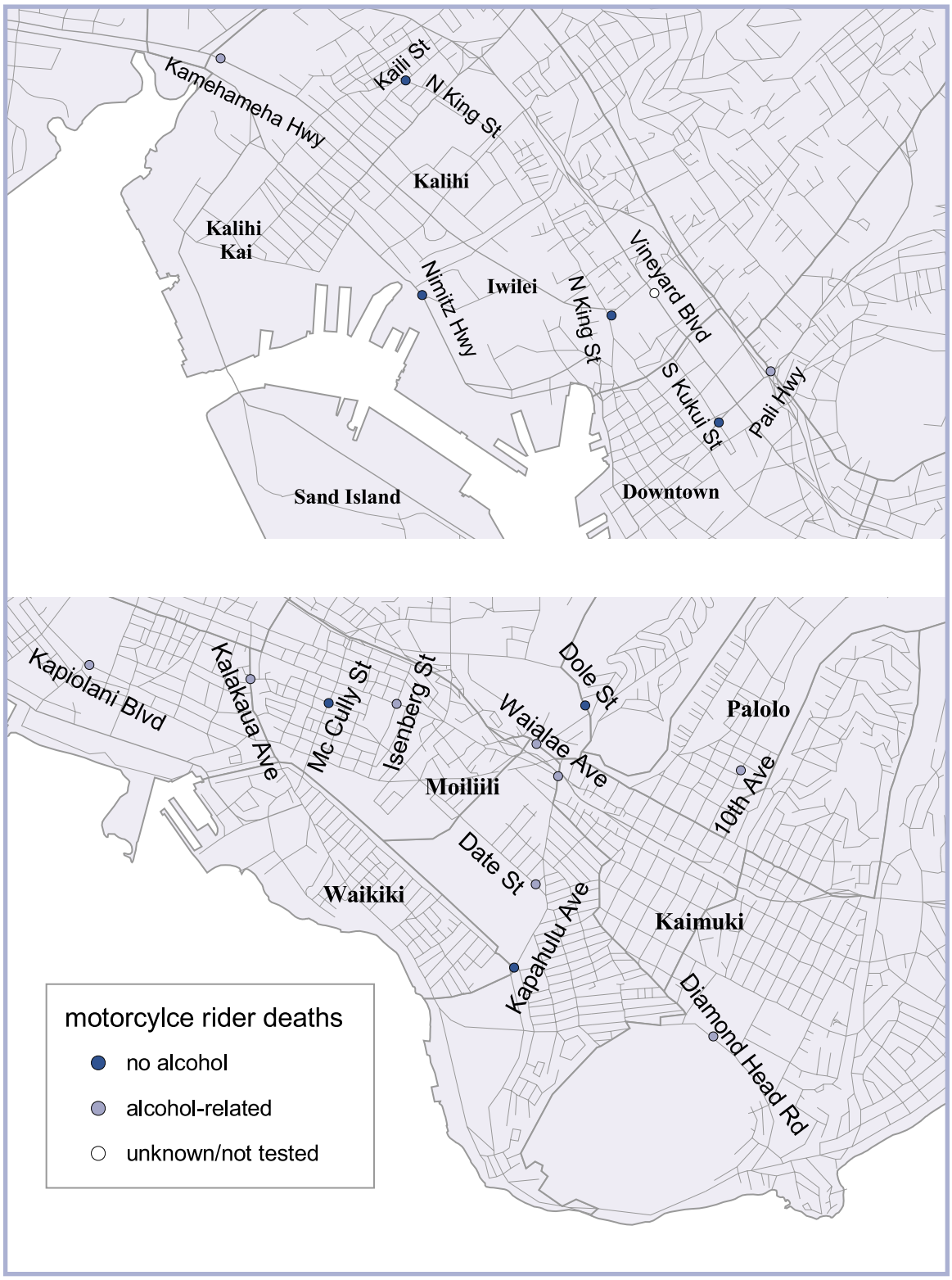
Many of the crashes in east O‘ahu occurred along major roads. Two of the 3 crashes in the Airport neighborhood happened along the H-1 freeway., and 4 of the 5 in Kalihi-Pālama were on major streets, including 1 on Dillingham, and 2 on Nimitz. The same pattern was seen for the windward communities of Kāne‘ohe and Kailua: 6 of the 9 fatal crashes were on major roads or highways.

Figure 51. Fatal motorcycle crashes in east O‘ahu, by neighborhood and alcohol involvement, 1996-2000.



The 18 crashes in the metropolitan Honolulu area are shown in more detail in Figure 52. Almost all of these crashes (15 of 18) were due to collisions with other automobiles. Alcohol involvement was much more common in the crashes in eastern Honolulu (8 of 11 crashes) (bottom map) than in western Honolulu.

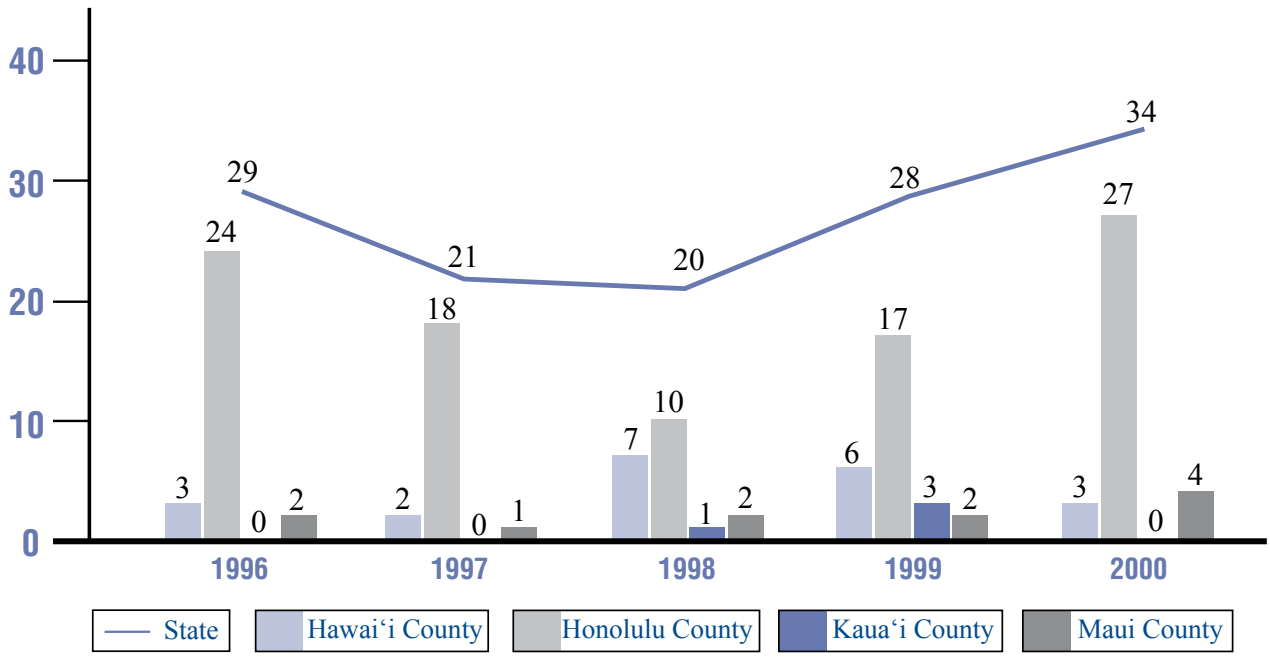
Figure 52. Locations of motorcycle crash fatalities in western (top map) and eastern (bottom map) Honolulu, by alcohol status, 1996-2000.



Pedestrians

Death among pedestrians was the 2nd most common type of motor vehicle death (after occupant fatalities), and the 5th leading cause of fatal unintentional injuries, as 132 pedestrians were killed in Hawai‘i over the 5-year period. The annual number of deaths varied inconsistently, but the highest total was in 2000 (Figure 53). The annual rate increased significantly over the 4-year period of 1997 to 2000. Only 1 pedestrian crash involved more than 1 victim. Almost three-fourths of the victims (73%, or 96) were struck on O‘ahu. Another 21 were struck on the island of Hawai‘i, 11 in Maui County (all on the island of Maui), and only 4 on Kaua‘i.

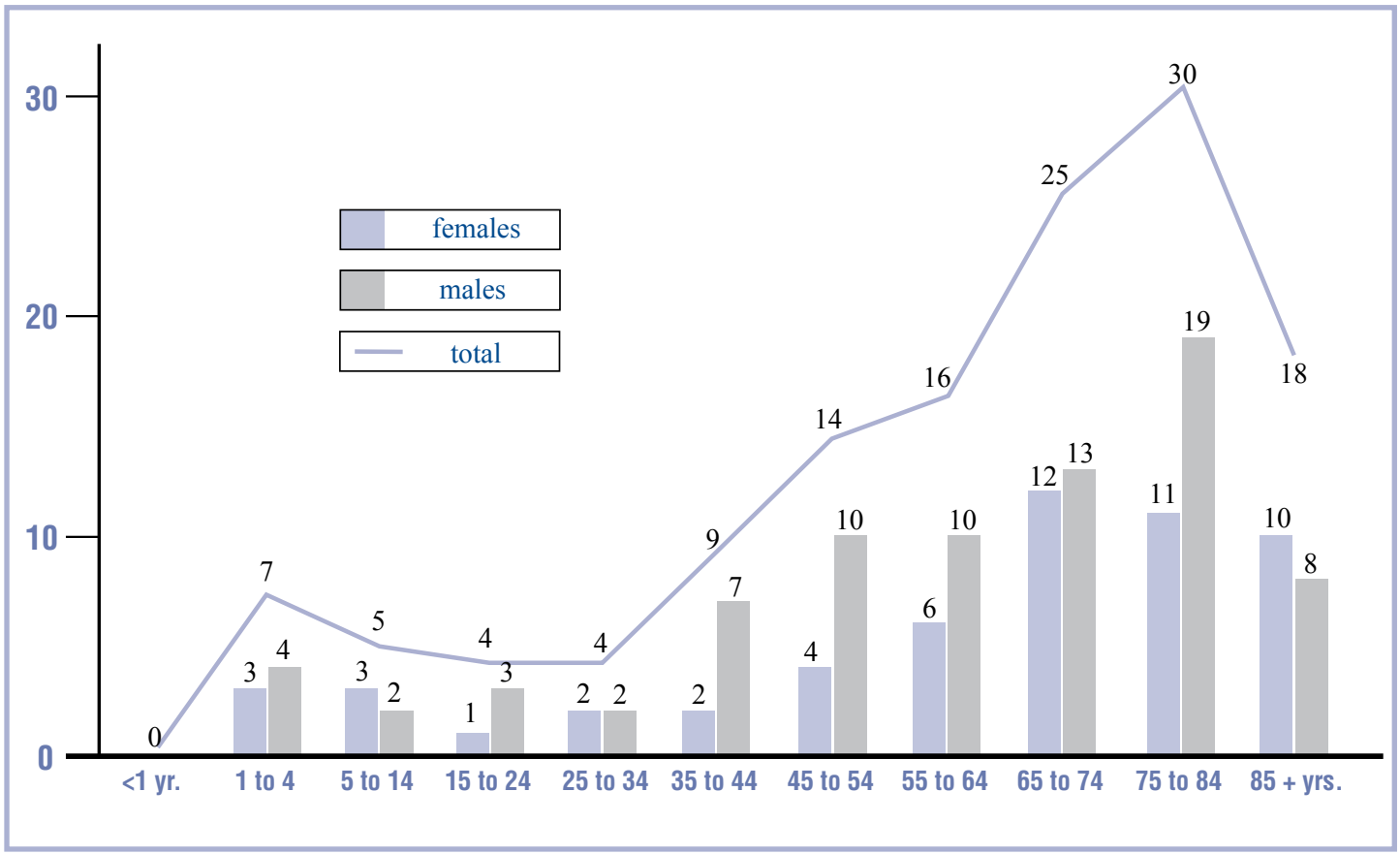
Figure 53. Annual number of pedestrian fatalities among Hawai‘i residents, by county, 1996-2000.



The annual pedestrian fatality rate increased significantly over the 4-year period of 1997 to 2000.

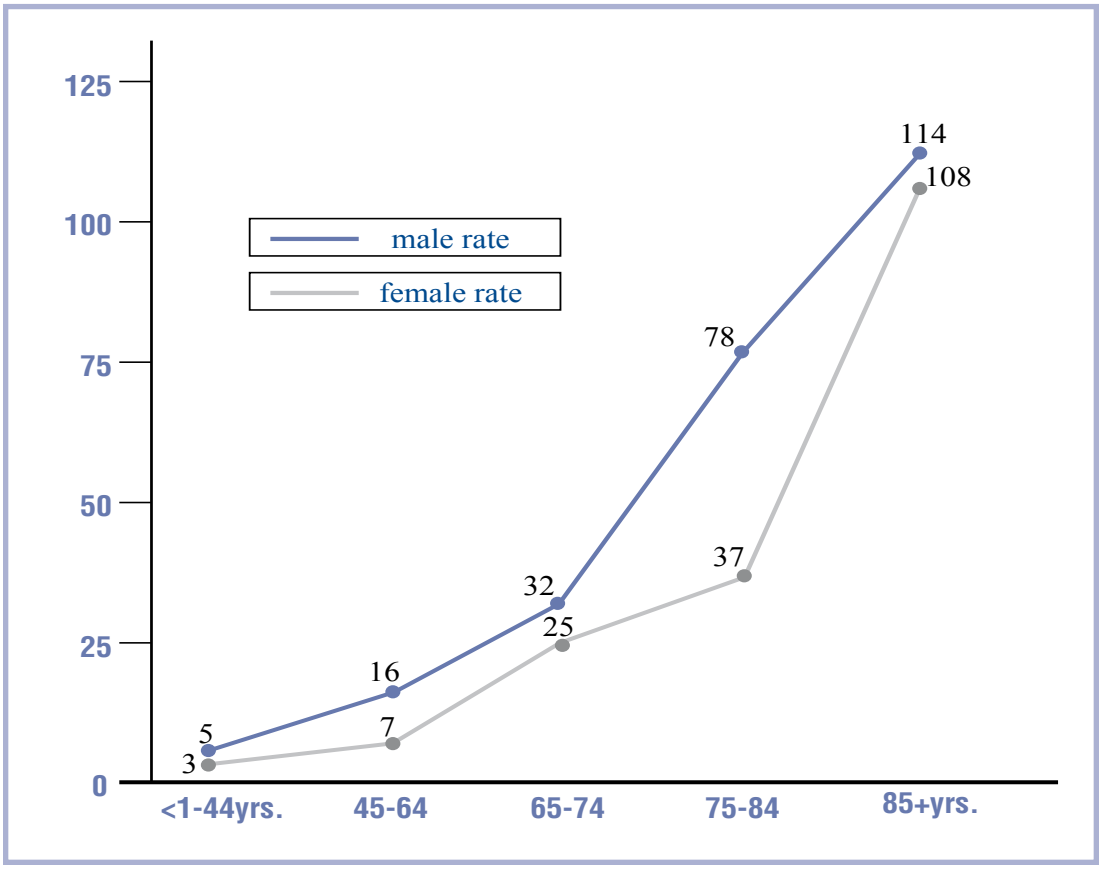
The ages of the victims ranged broadly from 1 to 94 years, although more than half (55%, or 73) were 65 years or older (Figure 54). Of the very young victims, 7 were between the ages of 1 and 4 years. One of the 1 year-old victims was being carried at the time of the crash, and another was struck in the driveway of a house. The majority of victims (59%, or 78) were males, and this proportion was fairly constant across the age range, although it was lowest in the youngest and oldest age groups.

Figure 54. Age and gender distribution of fatally injured pedestrians in Hawai'i, 1996-2000.



Pedestrian fatality rates increased steadily across the age range, particularly after age 65 (Figure 55). For example, rates for 65 to 74 year-olds are twice as high as rates for 45 to 64 year-olds, but they are about 4 times lower than the rates for residents aged 85 years and older. The figure also shows that rates were higher for males at every age, although the differences are small in the youngest and oldest age groups.

Figure 55. Pedestrian fatality rates (/100,000) among residents in Hawai‘i, by age and gender, 1996-2000.



There was no apparent pattern to the month in which these fatal crashes occurred. The highest number was in March (19 deaths), followed by January (16). The two lowest totals were in May (6) and June (5). There were between 9 and 13 pedestrian deaths in all other months. Surprisingly, Tuesday was the most common day on which these injuries occurred (28 deaths). Friday (23 deaths) and Saturday (25) were also common, and the fewest number (11) occurred on Sundays. The crashes occurred at all hours of the day, but there were two noticeable peak periods: 43 crashes occurred between 6:00 a.m. and 8:00 a.m., and 40 took place between 2:00 p.m. and 7:00 p.m. (Figure 56). Proportionally more of the injuries that took place on weekdays occurred during the morning hours, while more of those on the weekend occurred later in the day. Pedestrians on the Neighbor Islands were more likely to be killed in nighttime crashes (between 7:00 p.m. and 6:00 a.m.) than pedestrians on O‘ahu (60% vs. 37%, respectively).

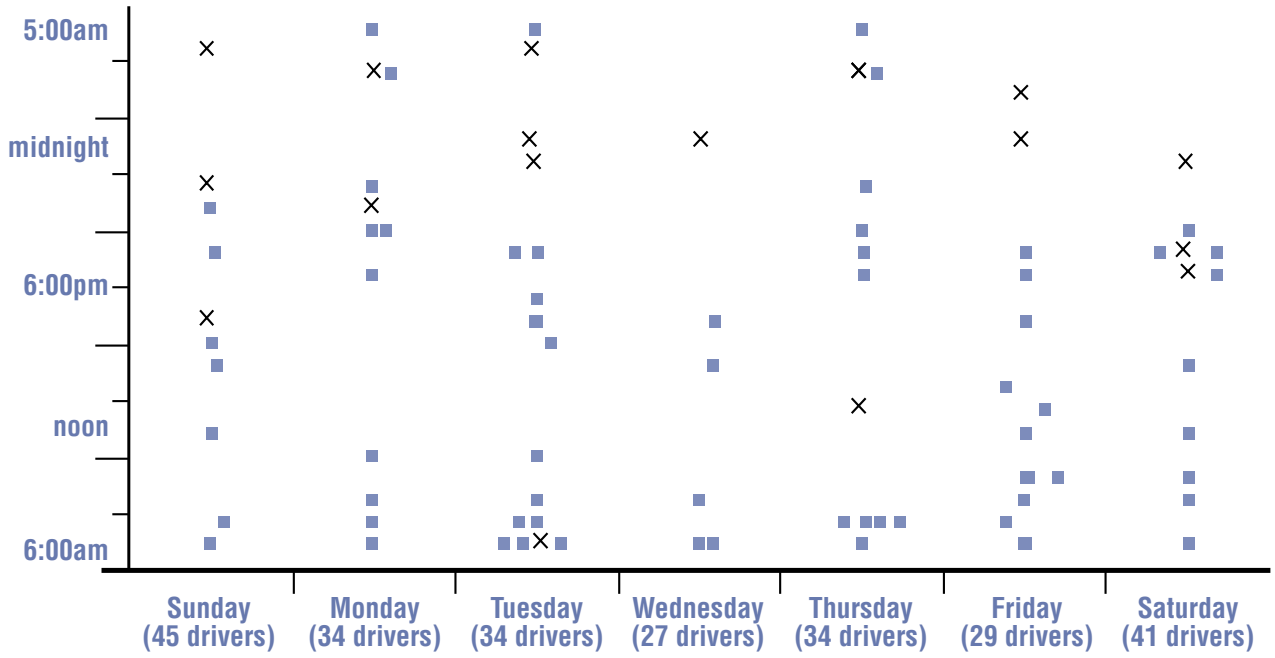
About 85% (112) of the fatalities could be matched to FARS records, which contain information on alcohol involvement in the crash. The analyses related to alcohol use were restricted to only the 103 victims linked to FARS records who were aged 15 years and older. According to FARS data, 18 (16%) of the pedestrians had been drinking at the time of the crash, and 11 (10%) were thought to be inebriated (BAC > 0.09). Alcohol use was significantly more common among the male victims (25%, or 15 of 59) than the female victims (7%, or 3 of 44). Victims who had been drinking were generally much younger than non-drinkers (average age: 50 vs. 68 years). Only 3 of the 59 (5%) victims who were 65 years or older had been drinking at the time of the crash. Alcohol use was most common among victims struck in Hawai‘i County (44%, or 8 of 18). In comparison, only 11% of the victims hit on O‘ahu (8 of 74) and 12% of those struck on Maui (1 of 8) had used alcohol.

Alcohol was actually involved in 21% of these 103 fatalities, as 4 non-drinking victims were struck by drivers who had been drinking. (Of the 9 victims who were under 15 years of age, 1 was struck by a driver who had been drinking.)

There was little association between alcohol use and the day of the week the crash occurred. However, alcohol use was much more likely among victims hit between 7:00 p.m. and 5:00 a.m. (42%, or 14 of 33), compared to those struck during the daylight hours (6%, or 4 of 70). There was no clear trend in alcohol use by victims over the 5-year period.

Figure 56. Temporal characteristics of fatal pedestrian crashes in Hawai'i, 1996-2000, by alcohol status of victims aged 15 years or older.

(Vertical axis shows time of day of crash, horizontal axis shows day of week. Victims who had been drinking are indicated by "x", non-drinkers by squares.)



A total of 115 vehicles were involved in the deaths of the 112 victims linked to FARS records, as 3 victims were hit by more than one car. (All of the vehicles were cars; none were motorcycles.) According to FARS records, only about 11% (12) of those cars were estimated to be speeding at the time of the crash. Ten of those crashes involving speeding occurred on O'ahu; the other 2 were on the island of Hawai'i.

According to FARS data, more than half (52%, or 58) of the pedestrian victims were in the roadway erroneously, most commonly by "improper crossing of roadway or intersection" (i.e. jaywalking) (32 victims). Other pedestrian errors were darting into the road (15 victims), or otherwise walking, sitting or standing in the roadway (15). Seven of the victims were reportedly "not visible" to the drivers.

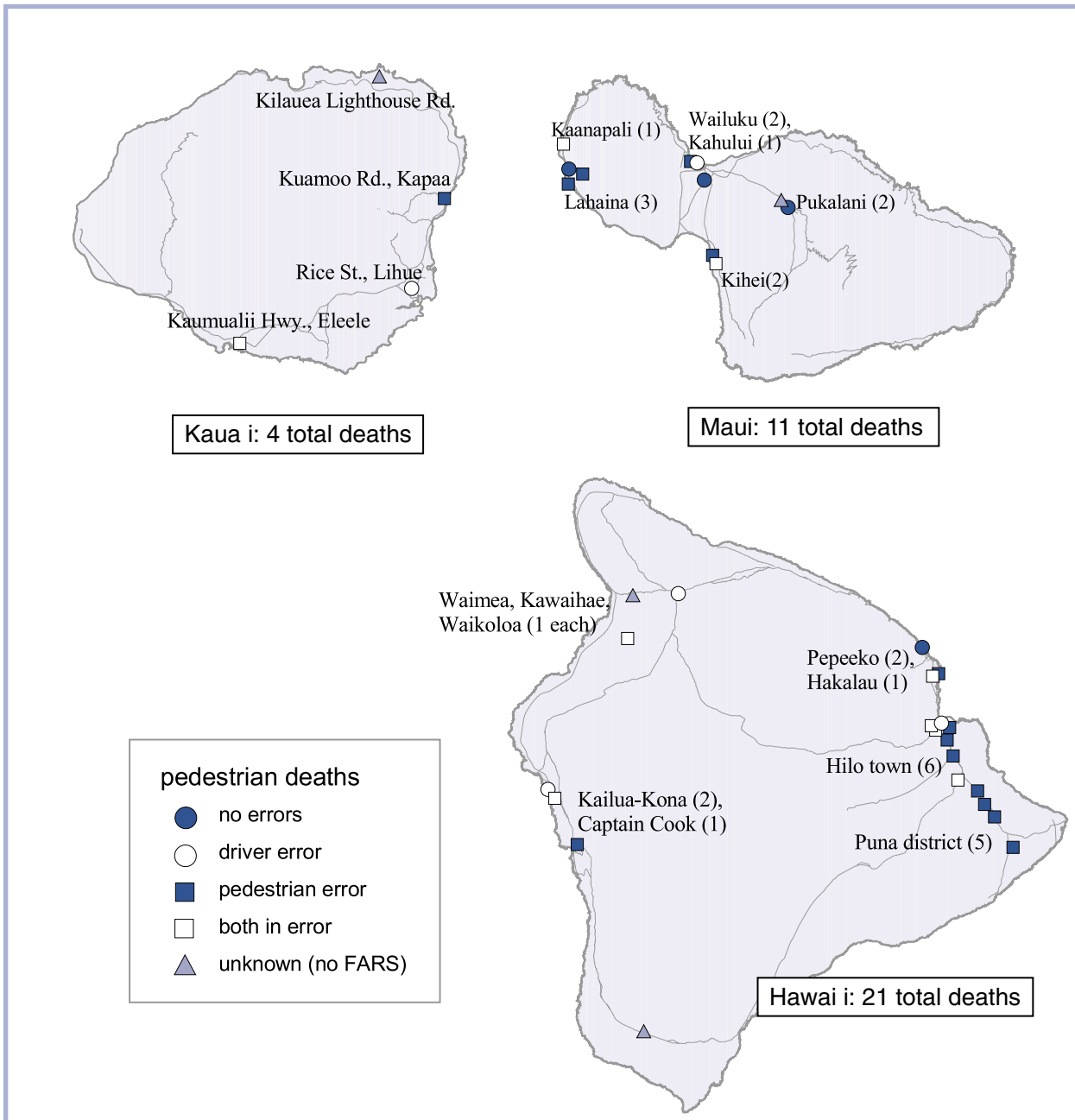
The majority of the drivers involved in the crash (54%, or 61) made an error which contributed to the crash. Most commonly, there was a "failure to yield right of way" on the part of 31 drivers. Twenty-seven were described as "inattentive", 12 were speeding, and 8 failed to stay in their proper lane.

Overall, only 7 (6%) of the fatalities did not result from errors on the part of either the pedestrian or the driver. (In this case, the use of alcohol by either the pedestrian or the driver is considered an "error".) Pedestrian error contributed to 43 of the deaths, driver error to 42, and errors on the parts of both parties to the remaining 20 deaths.

Following is a series of maps showing the sites of crashes which resulted in pedestrian fatalities. Also indicated is the "error", whether on the part of the pedestrian, the driver, or both. For the pedestrian, "error" means the use of alcohol or pedestrian presence in the roadway as the result of jaywalking, ignoring traffic signs and signals, or other incorrect behaviors. For drivers, "error" also means the use of alcohol, or speeding, inattention, or other poor driving actions.

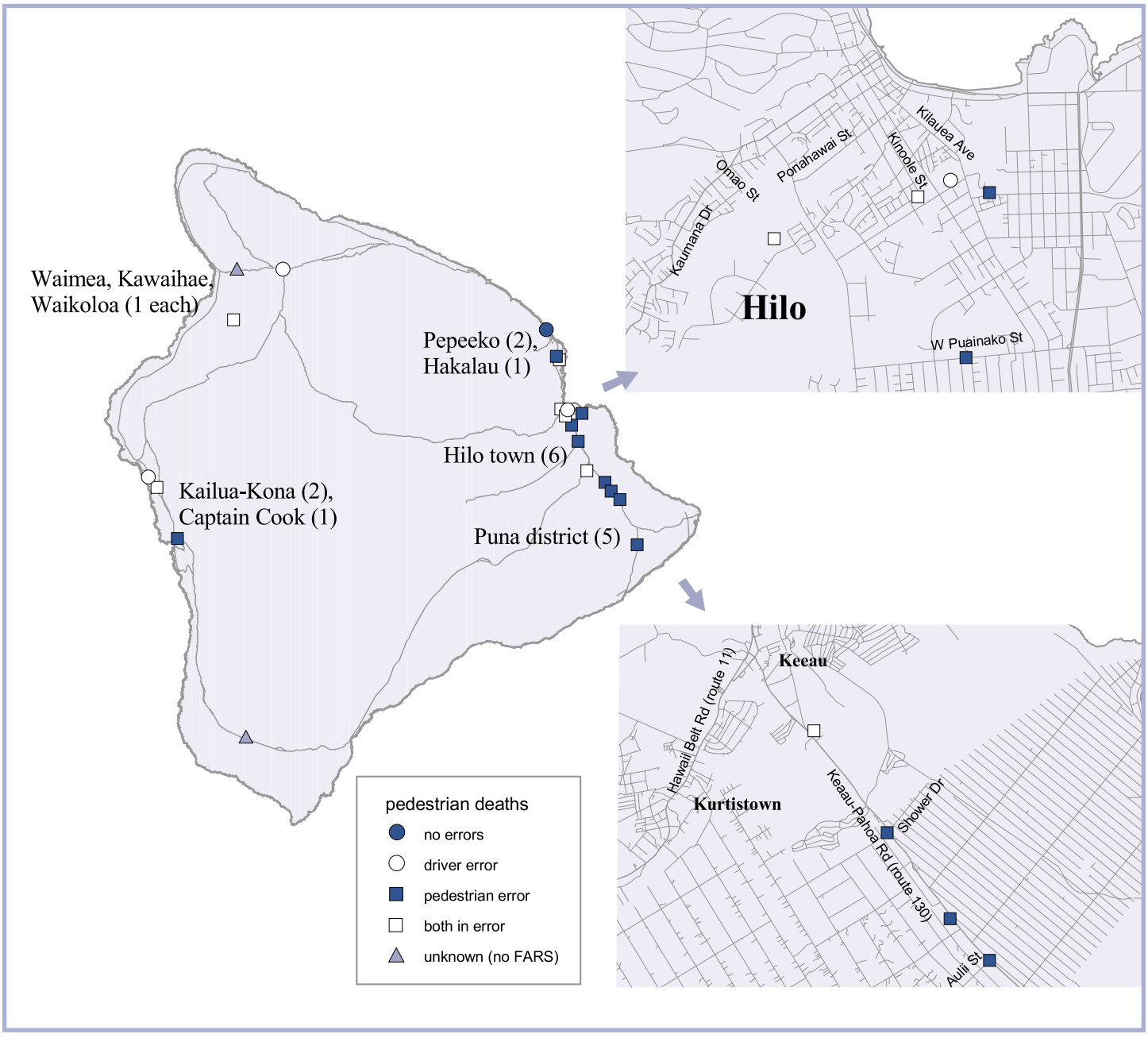
The 4 fatalities on Kauaʻi were spread out over the eastern half of the island (Figure 57). More than half of the 11 pedestrian deaths on Maui occurred in the urbanized areas of Lahaina (3 deaths) and Wailuku/Kahului (3 deaths). There were 2 deaths each in Pukalani and the Kīhei area. About half (52%, or 11) of the 21 pedestrians killed on Hawaiʻi were hit in the Hilo (6) and Puna (5) districts, mostly in the Keaʻau area.

Figure 57. Locations of pedestrian fatalities in Neighbor Islands, by driver/pedestrian error status, 1996-2000.



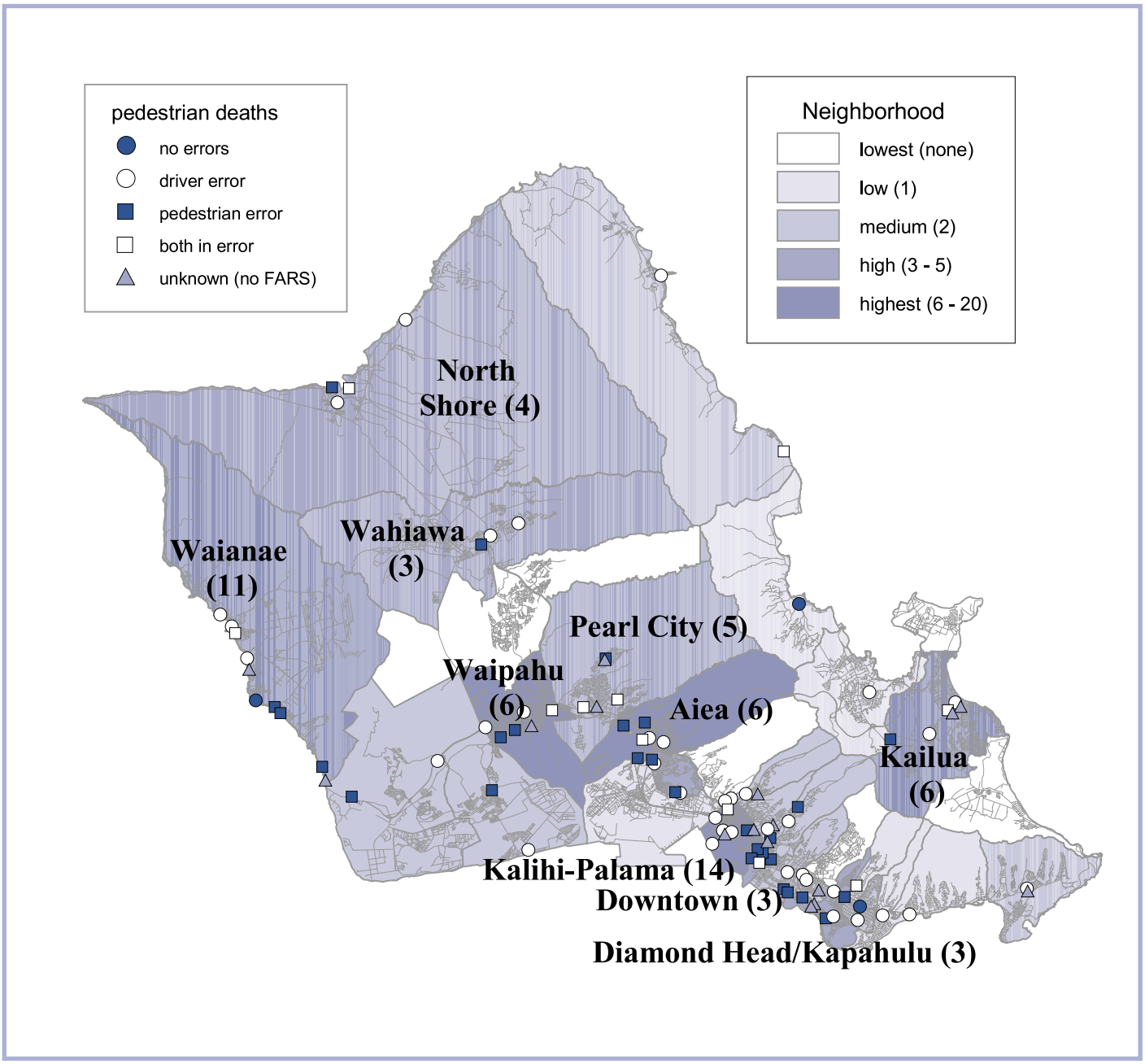
All but 1 of the crashes in the Hilo and Puna areas involved errors on the part of the pedestrian victims, including 9 who were mistakenly in the roadway (Figure 58). The crashes in Hilo were widely dispersed around the town. Three pedestrians were hit along the Kea'au-Pāhoa Road (route 130). Two of those victims had been drinking at the time of the crash and 2 were in the roadway erroneously.

Figure 58. Locations of pedestrian fatalities in Hawai'i County, by driver/pedestrian error status, 1996-2000.



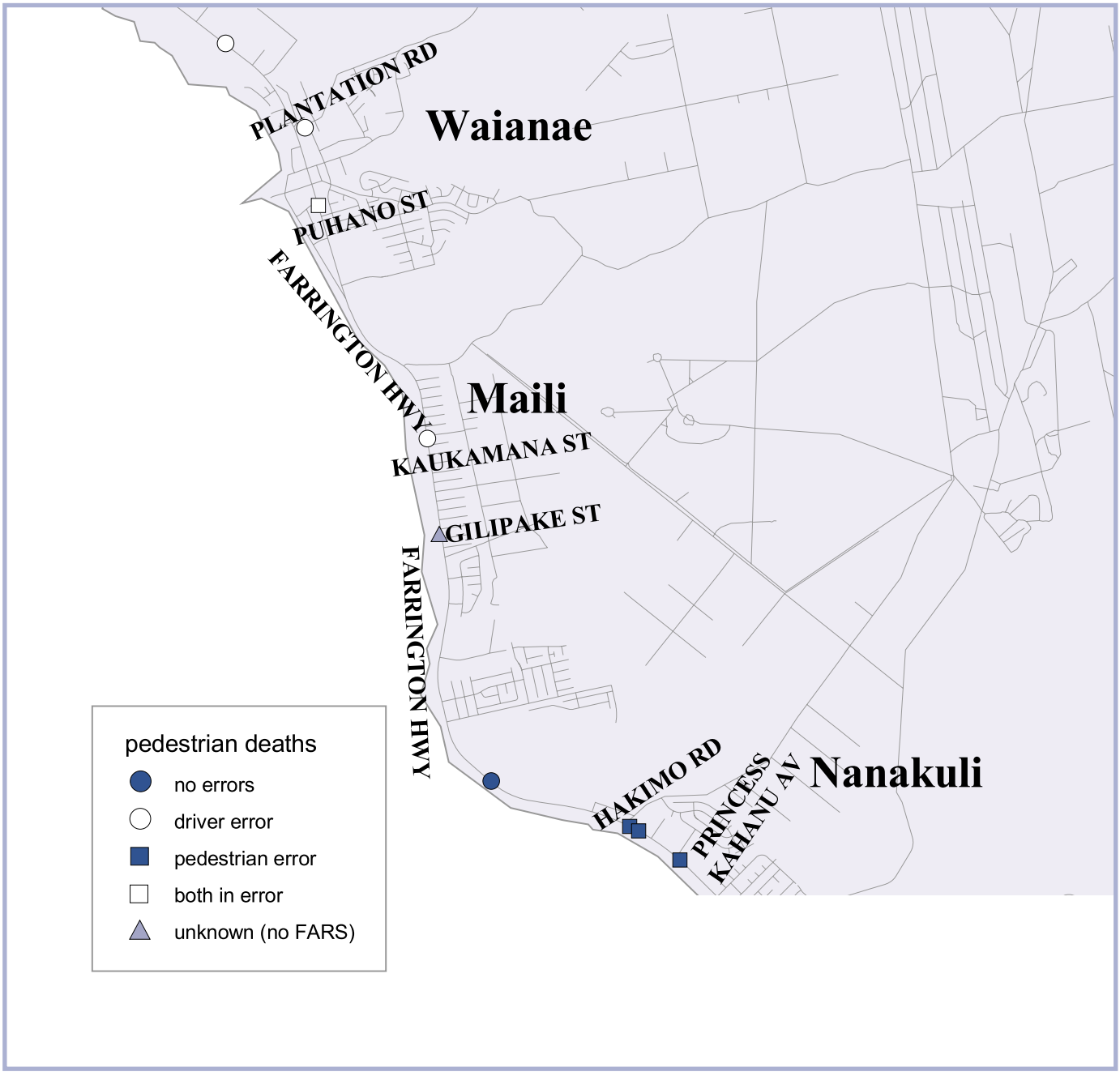
On O‘ahu, the neighborhood boards of Kalihi-Pālama and Wai‘anae had by far the highest totals of pedestrian deaths (Figure 59). Other areas with notably high numbers were ‘Aiea, Waipahu, Kailua and Pearl City. Driver error contributed to a higher proportion of the pedestrian crashes on O‘ahu than crashes on the Neighbor Islands (60% vs. 44%, respectively). Pedestrian error was most common in crashes in the western and central parts of the island. More than half (54%, or 52) of the 96 pedestrian fatalities on O‘ahu occurred during morning hours (between 6:00 a.m. and 12:00 p.m.). Another 28 (29%) were during the afternoon (from 1:00 p.m. to 7:00 p.m.), and only 15 (16%) were during nighttime hours (8:00 p.m. to 5:00 a.m.). Nighttime fatalities were generally more common in the more rural parts of O‘ahu, especially in Wai‘anae, where more than half (6) of the 11 fatalities occurred during these hours.

Figure 59. Locations of pedestrian fatalities on O‘ahu, by driver/pedestrian error status and district, 1996-2000.



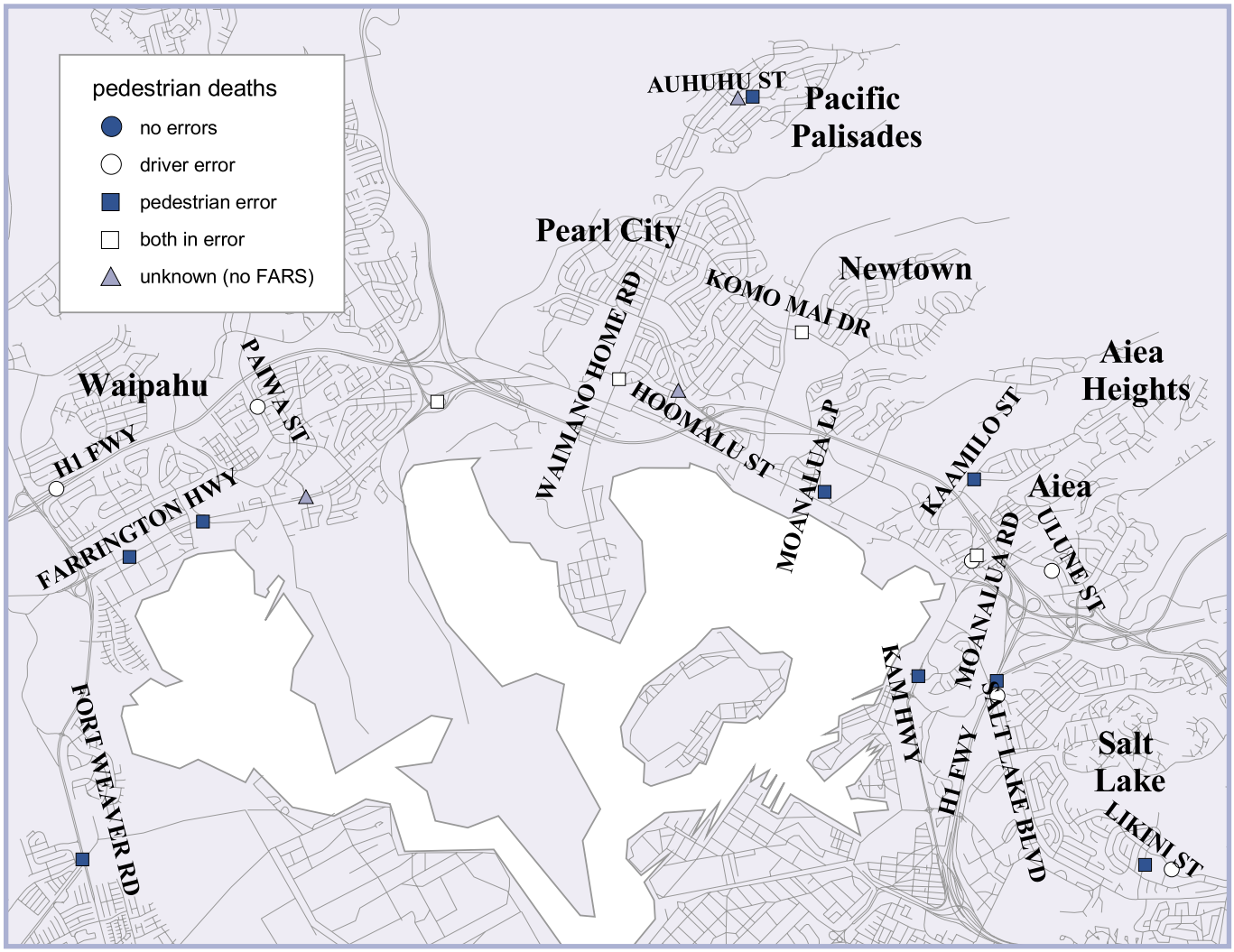
All of the Wai‘anae fatalities were along Farrington Highway, mostly (9 of 11) along the stretch from Wai‘anae to Nānākuli (Figure 60). All but 1 of the 6 deaths between Mā‘ili and Nānākuli were at night. Wai‘anae also had the highest number of alcohol-related pedestrian fatalities (3). The 3 deaths in Nānākuli involved errors on the part of the pedestrians, while driver errors contributed to the deaths in Wai‘anae.

Figure 60. Locations of pedestrian fatalities in western O‘ahu, by driver/pedestrian error status, 1996-2000.



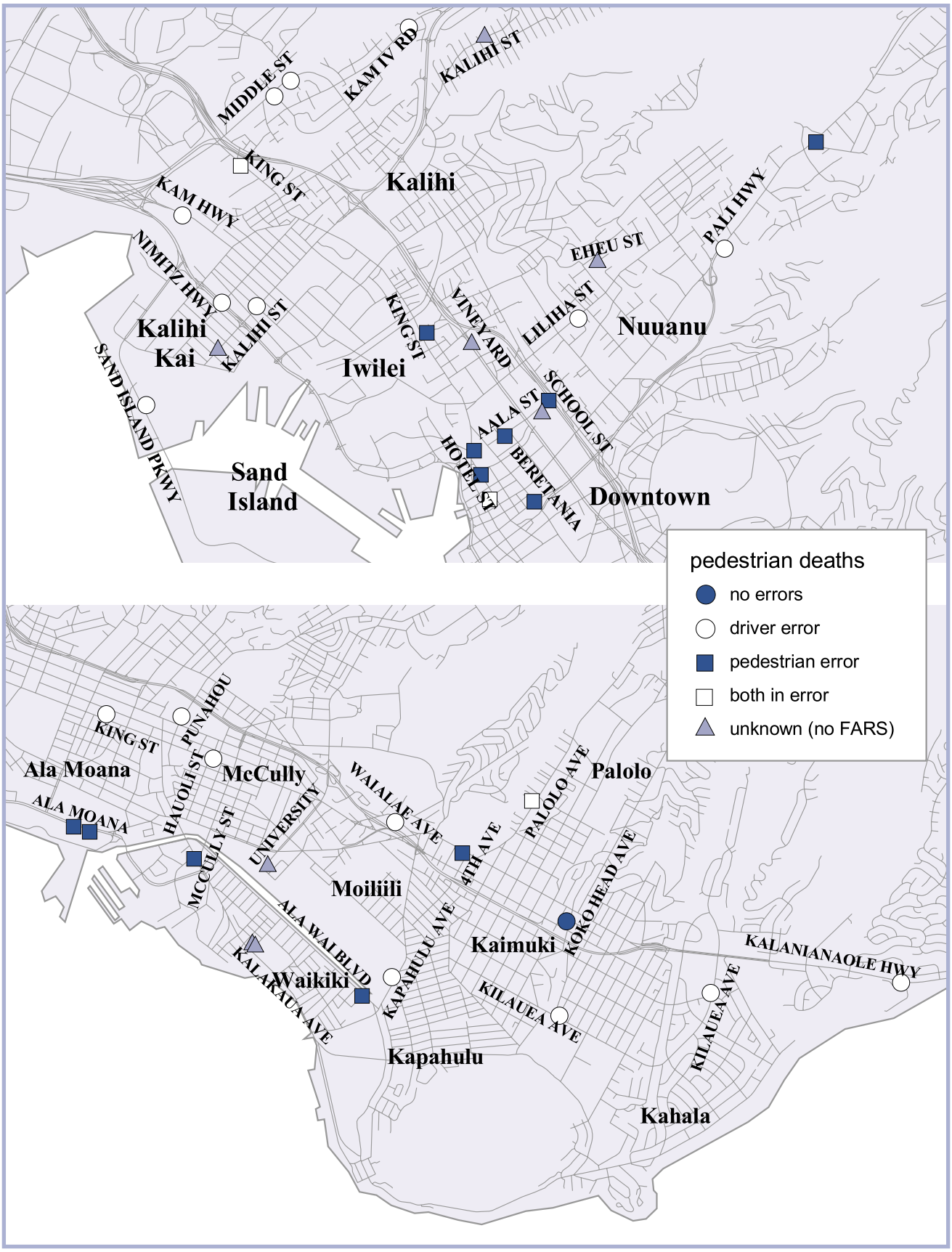
The fatal pedestrian crashes in the Waipahu, Pearl City and ʻAiea areas were dispersed fairly widely (Figure 61). Most occurred during morning hours; only 1 was at night.

Figure 61. Locations of pedestrian fatalities in the Pearl Harbor area, by driver/pedestrian error status, 1996-2000.



There were 2 clusters of pedestrian fatalities in western Honolulu area: the ʻAʻala Street/Beretania area, and the Kalihi Kai portion of the Kalihi-Pālama neighborhood board (top map of Figure 62). Again, almost all of these crashes occurred during the morning hours. Almost all of the crashes in the Kalihi Valley and Kalihi Kai area involved errors on the part of the drivers. Conversely, most of fatal incidents in the downtown area involved pedestrian errors. The crashes in eastern Honolulu were generally more dispersed (bottom map).

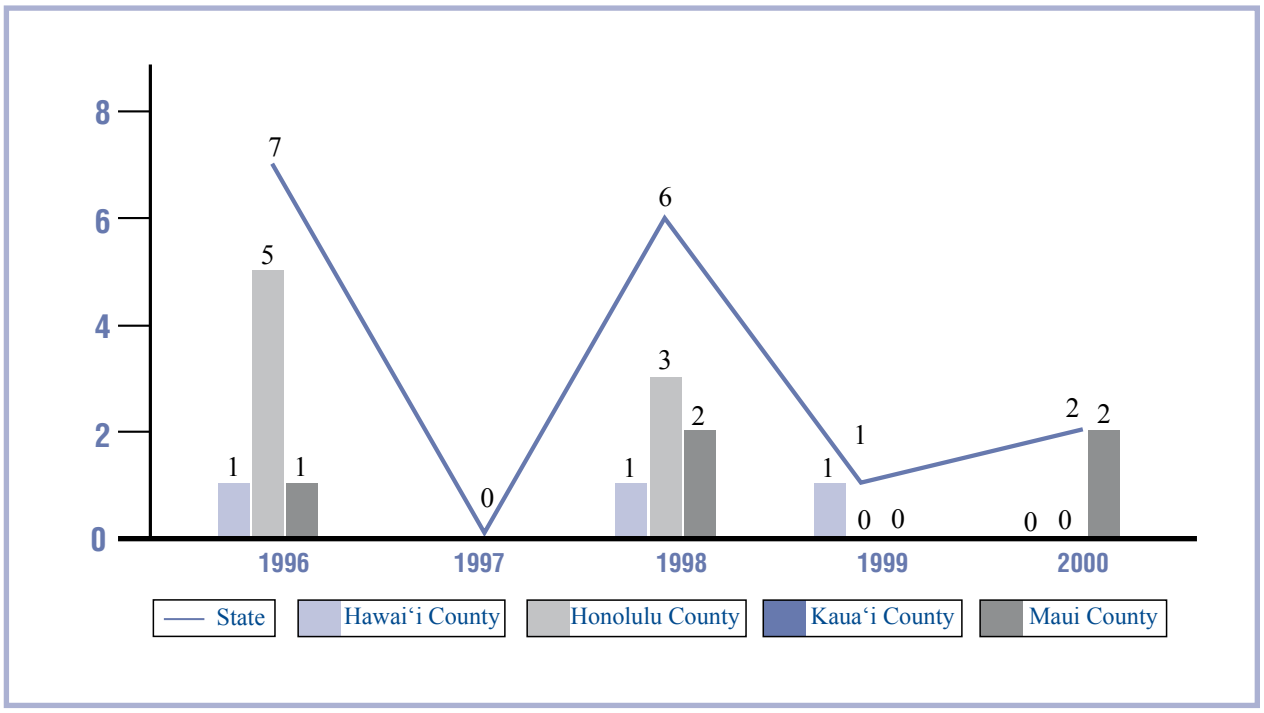
Figure 62. Locations of pedestrian fatalities in western (top map) and eastern (bottom map) Honolulu, by driver/pedestrian error status, 1996-2000.



Bicyclists

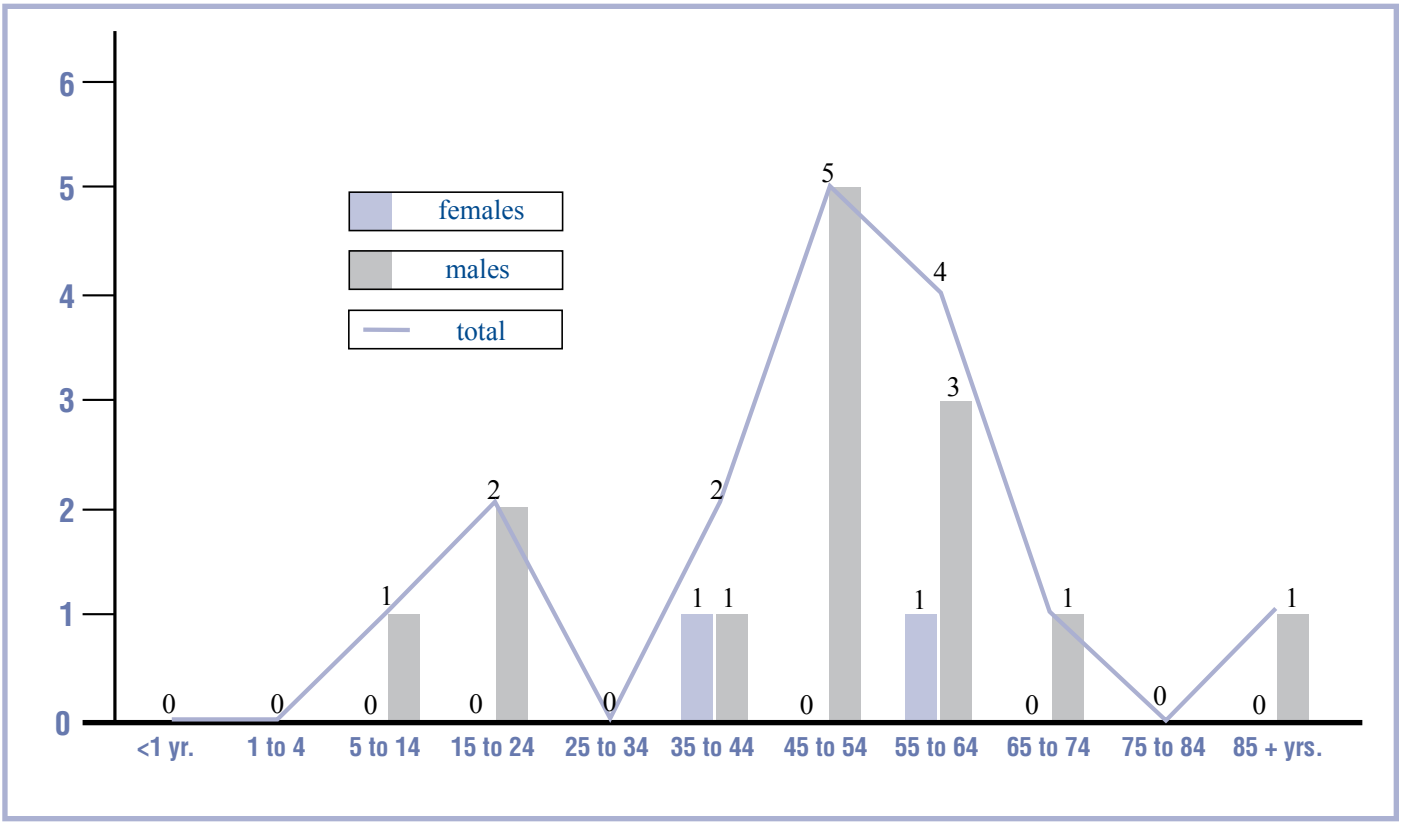
Fatalities among bicyclists were the least common type of fatality from motor vehicle crashes. There were 16 fatalities among resident bicyclists in Hawai‘i, with the annual total varying between 7 and none (Figure 63). Only 3 fatalities occurred after 1998. Half of the victims were injured on O‘ahu, 5 in Maui County (4 on the island of Maui, and 1 on Lāna‘i), and 3 on the island of Hawai‘i. There were no fatalities on the island of Kaua‘i over the 5-year period.

Figure 63. Annual number of bicyclist fatalities among Hawai‘i residents, by county, 1996-2000.



The age of the victims ranged from 6 to 86 years, but most (69%, or 11) were between the ages of 35 and 64 years (Figure 64). Almost all (88%, or 14) of the victims were males. Only 2 of the bicyclists were injured during night-time hours. (This information was missing for 4 cases.) The most common times were between 10:00 a.m. and 1:00 p.m. Six of the 12 cyclists for whom this information was available were injured during these times. Almost half (44%, or 7) of the cyclists were killed on weekends, including 5 killed on Sundays. Half (8) of the cyclists were killed during the 4-month period of September to December, including 5 who were killed in November.

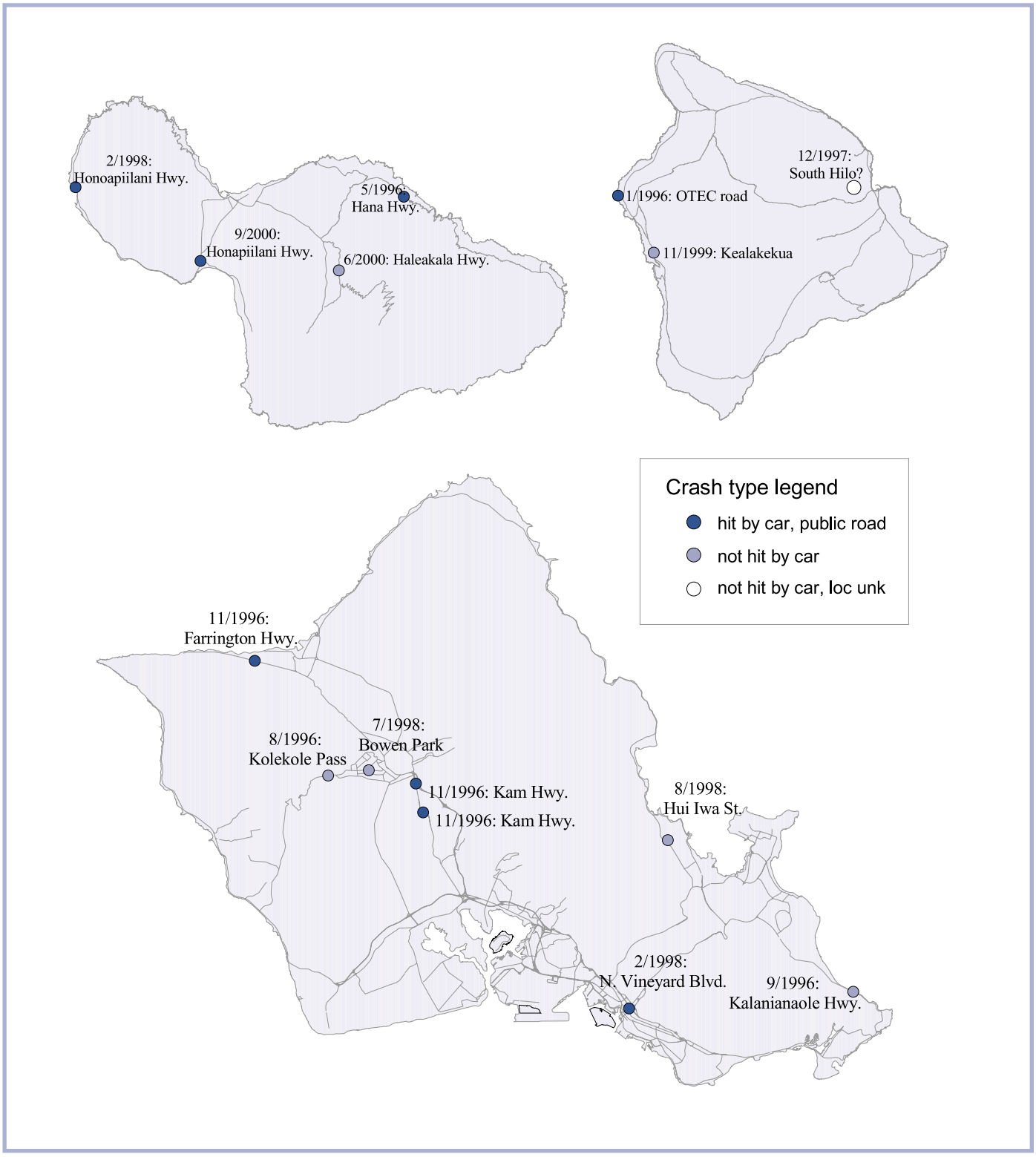
Figure 64. Age and gender distribution of fatally injured bicyclists in Hawai'i, 1996-2000.



Only half (8) of the victims were struck by a motor vehicle. The other half died as a result of falling off their bicycles (6 victims), or as a result of collisions with pedestrians (2). Figure 65 shows the locations of these 16 fatal crashes, including the type of injury (hit by car vs. other). The 4 crashes on Maui were distributed around the island, although all were on major highways. (There were 3 other non-resident bicyclists who were killed in the Haleakalā area over the same time period.) Likewise, 4 of the 8 victims killed on O'ahu were on major roads. Two others were killed on non-public streets in the Wahiawā area.

Only half (8) of the bicyclists were struck by a motor vehicle. The other half died as a result of falling off their bicycles (6 victims), or as a result of collisions with pedestrians (2).

Figure 65. Location of fatal crashes among resident bicyclists in Hawai'i, by type of crash, 1996-2000.

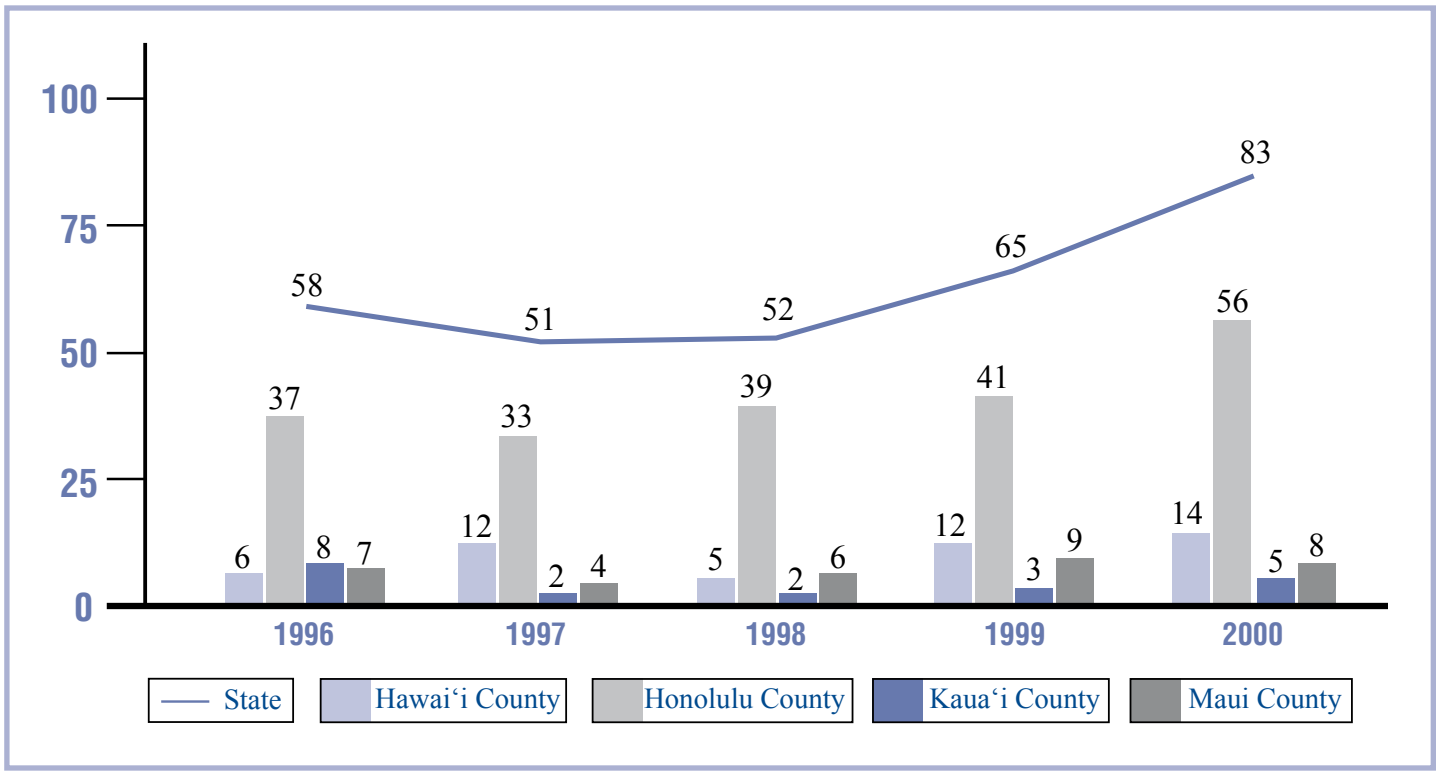


FARS data was linked to 6 of the 7 bicyclists hit on public roads by motor vehicles. Only half (3) of those 6 victims were wearing helmets at the time of the crash. Two of the bicyclists were hit by drivers who had been drinking, including 1 driver with an estimated BAC of over 0.09%. Speed was not considered a factor in any of the crashes.

Falls:

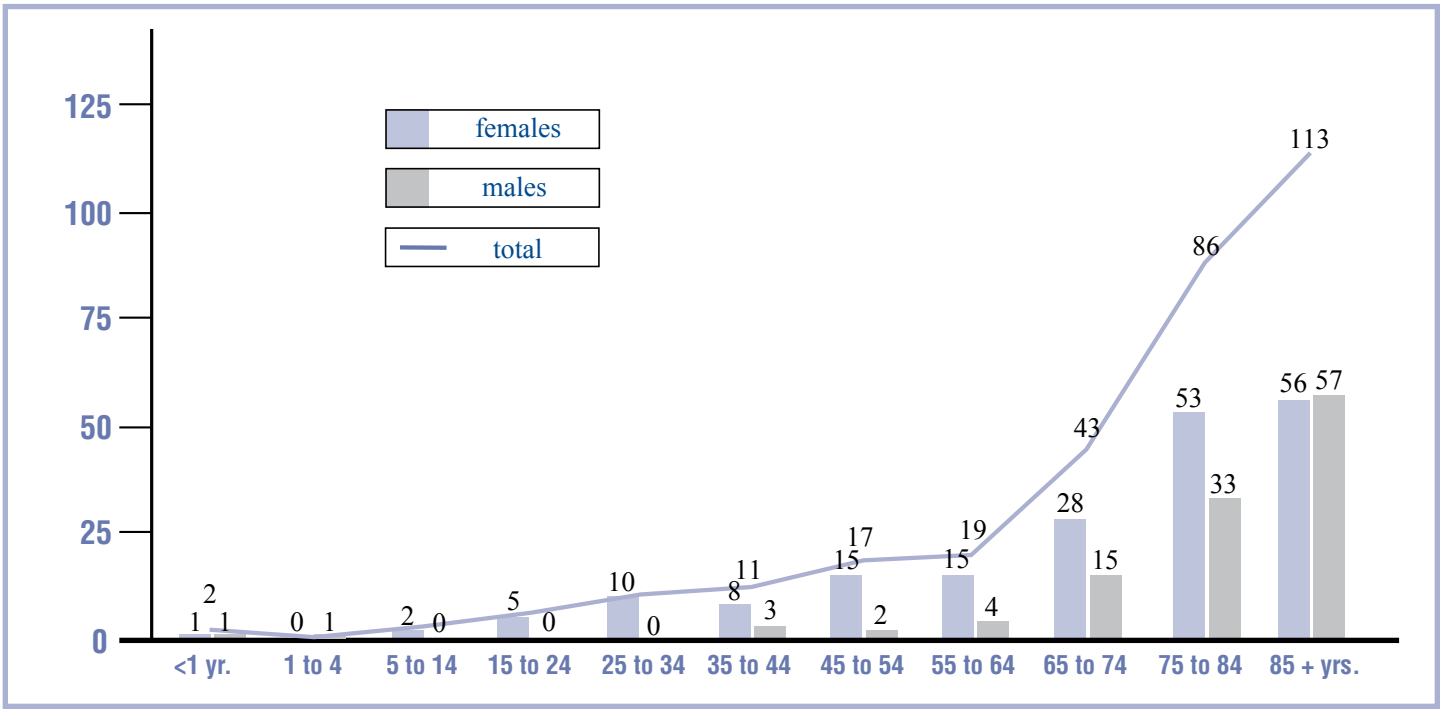
Falls were the 2nd most common type of fatal unintentional injury in the state, behind only those among motor vehicle occupants. There were 309 fatal falls over the 5-year period, with the highest number, by far, occurring in the year 2000 (Figure 66). This upward trend was statistically significant, with the rate increasing by an estimated 10% each year (95% confidence interval: 2% to 20%). Two-thirds (67%, or 206) of the injuries occurred on O‘ahu, although fatal falls occurred in each county in each year. Almost half (48%, or 49) of the 103 fatalities on the Neighbor Islands occurred on the island of Hawai‘i.

Figure 66. Annual number of fatal falls among Hawai‘i residents, by county, 1996-2000.



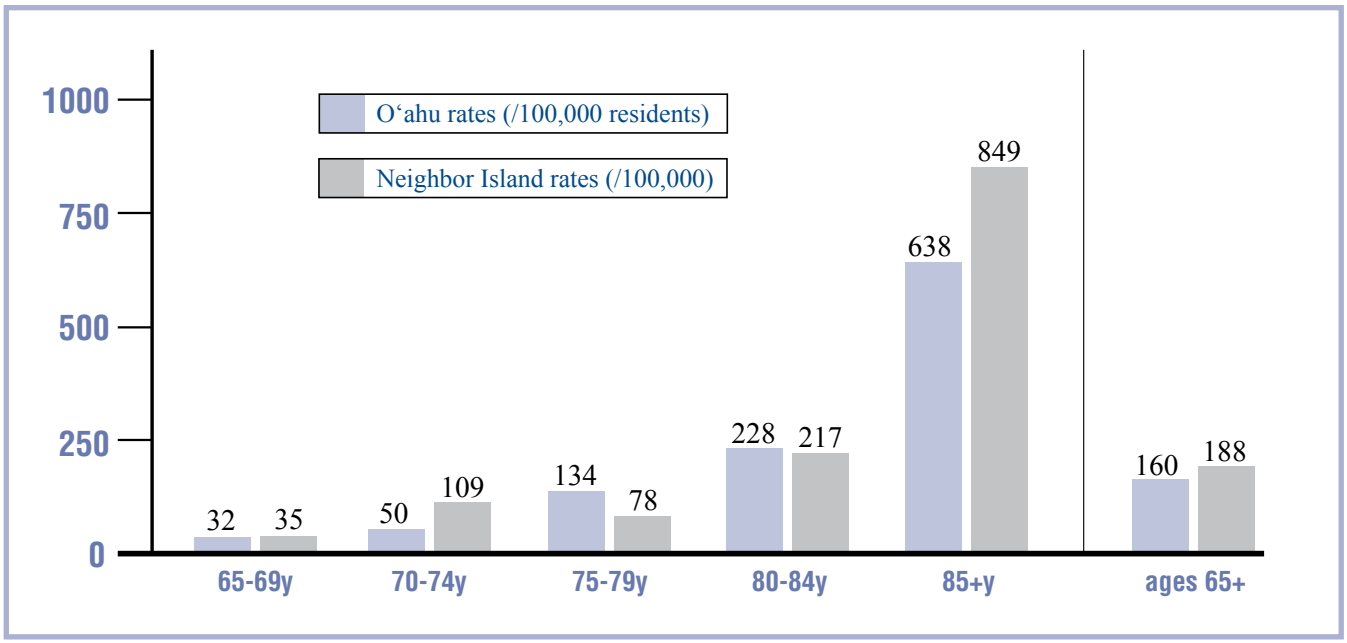
More than three-fourths (78%, or 242) of the falls victims were aged 65 years or older, and nearly two-thirds (64%, or 199) were 75 or older (Figure 67). Like most of the major injury categories, two-thirds (63%, or 194) of the falls victims were males. The gender distribution was more equal among the older victims. In contrast, 87% (27 of 31) of the victims under 45 years old were males.

Figure 67. Age and gender distribution of fall victims in Hawai'i, 1996-2000.



The rate of fatal falls among the elderly increased dramatically with age (Figure 68). The rates for those aged 85 years or older was 21 times higher than the rate among 65 to 69 year-olds. The rates among Neighbor Island residents aged 85 years or older were 33% higher compared to rates among similarly-aged O'ahu residents. Rate comparisons for other age groups were closer, but overall rates were 18% higher among the Neighbor Island elderly, compared to O'ahu (160 vs. 188/100,000). (However, most of the rate estimates below the age of 85 years are based on small numbers and should be interpreted with caution.)

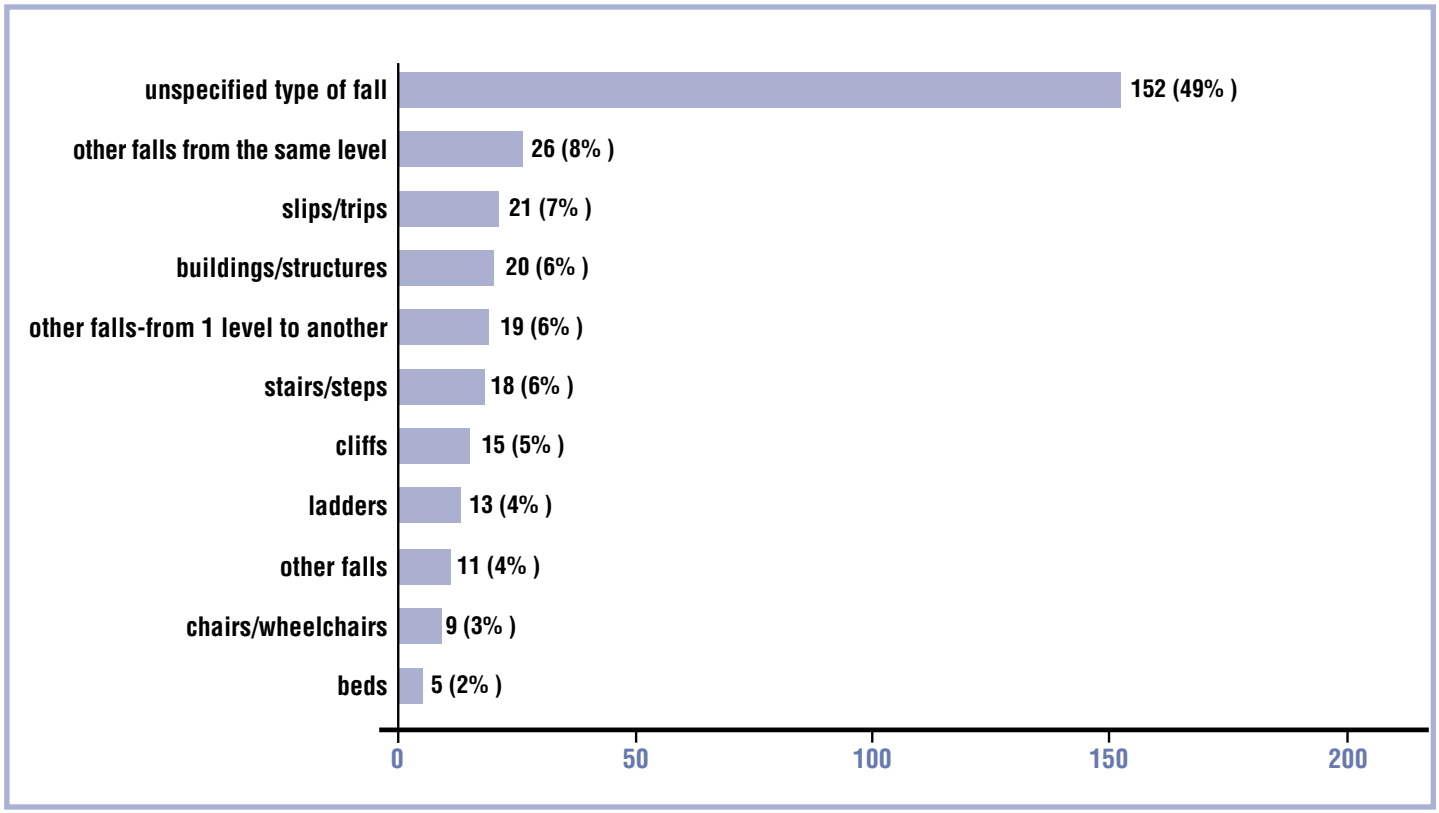
Figure 68. Five-year rates of fatal falls among elderly residents of O'ahu, and Neighbor Islands, by age group, 1996-2000.



**The summary rate (65 years and older) is age-standardized across three age categories (65-74 years, 75-84 years, and 85 years and older), using the U.S. 2000 standard distribution.*

Figure 69 shows that the type of fatal fall was "unspecified" for about one half (152) of the incidents. Another 18% (55) were coded as "other" types of falls. Among the remaining 102 fatalities, the more common types of fatal falls were from slips or trips, or falls from buildings, stairs or steps, cliffs, and ladders.

Figure 69. Fatal falls among Hawai'i residents, by type of fall, 1996-2000.

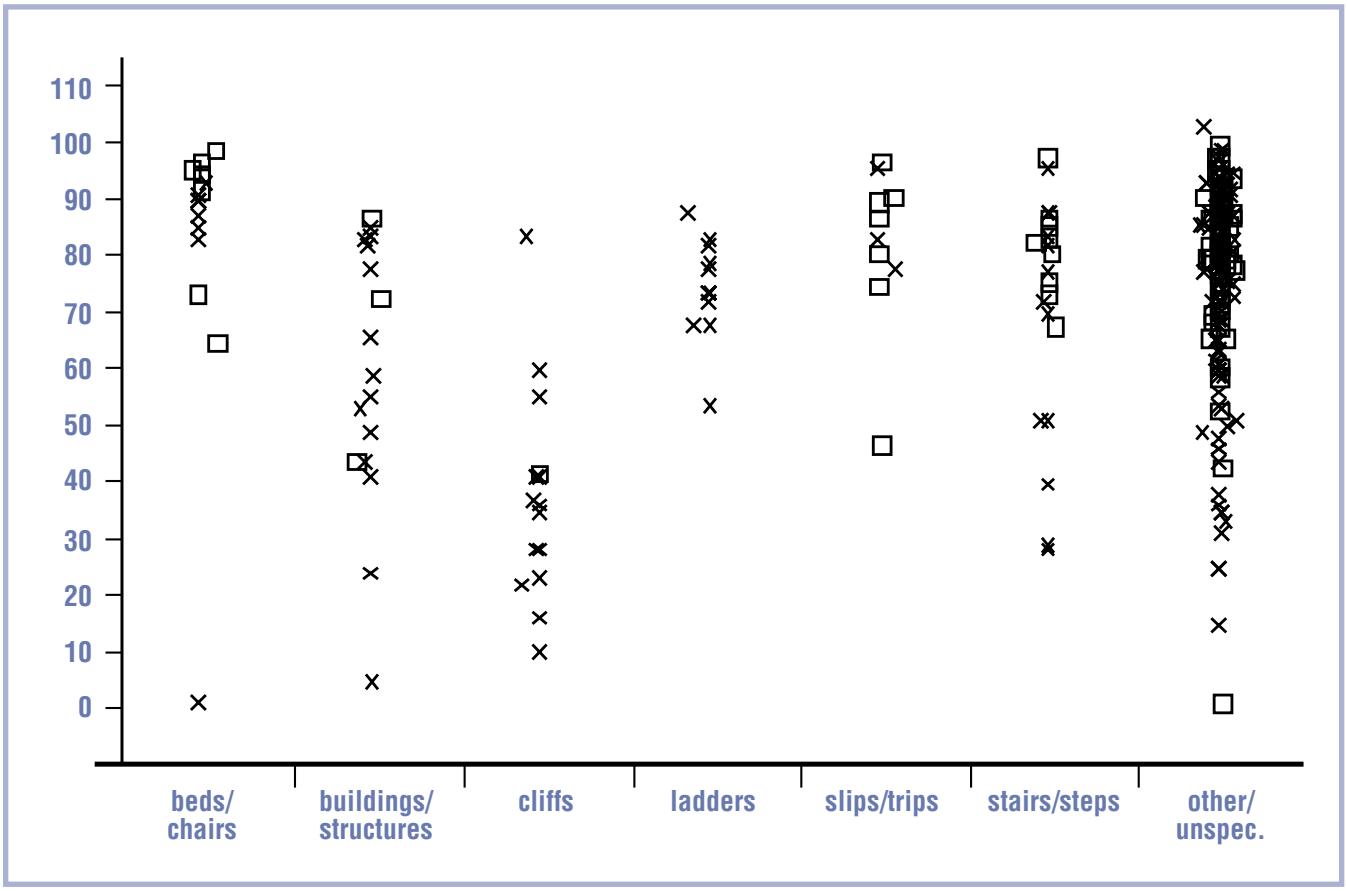


The rate of fatal falls among the elderly increased dramatically with age. The rate for those aged 85 years or older was 21 times higher than the rate among 65 to 69 year-olds.

The age and sex distribution of the victims differed by the type of fatal fall (Figure 70). All but 1 of the 15 victims who fell from cliffs were between 20 and 60 years of age, and all but 1 were males. None of these 15 falls occurred on O'ahu; 6 were on Maui, 5 on Hawai'i, and 4 on Kaua'i. The other category with an appreciable number of younger victims was falls from buildings. There was one infant victim, and one 4-year-old along with 9 other victims under 60 years of age. Fifteen of these 20 victims were male. All of the 13 victims who fell from ladders were males. Gender was more equally distributed among the victims who fell from beds or chairs (50% female), from slips or trips (52% female), or from stairs or steps (44% female).

Figure 70. Age distribution of falls victims in Hawai'i, by type of fall, 1996-2000.

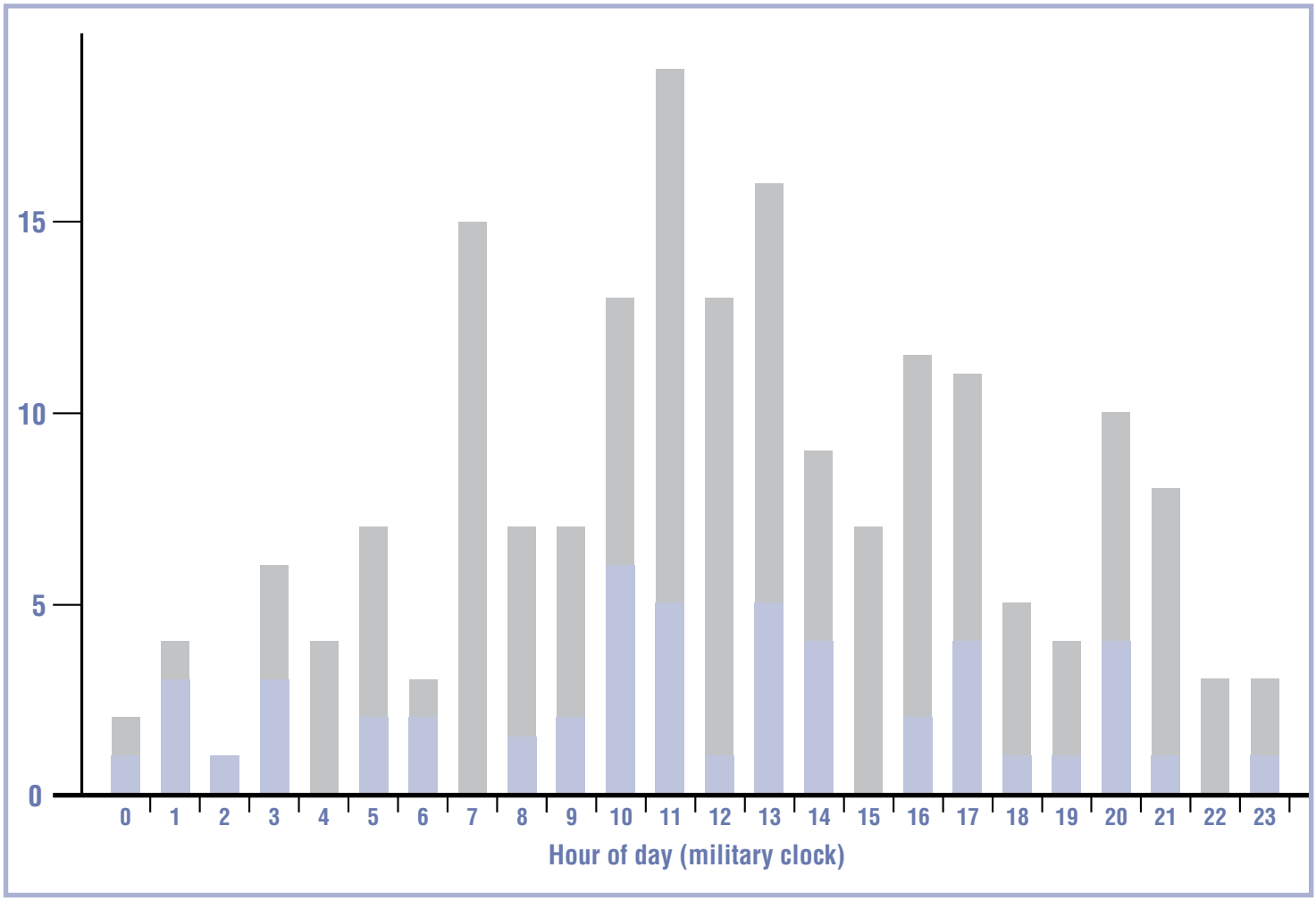
(Male victims indicated by "x", females by open squares.)



Information on the time of the injury was available for 188 of the 309 (61%) fatal falls. Although falls occurred at all hours of the day, most (71%, or 133) occurred during daylight hours, between 7:00 a.m. and 6:00 p.m. (Figure 71). For the remaining 55 falls, the most common time period was between 7:00 p.m. and 10:00 p.m. The falls occurred fairly evenly over the days of the week. There were also no clear trends across the months of the year, although the highest number, by far, (27, or 14%) took place in December. Monthly totals varied between 8 (November) and 19 (September) over the rest of the year. (These temporal characteristics were similar when based only on fatal falls among victims aged 65 years and older.)

Figure 71. Time of day of fatal falls in Hawai'i, 1996-2000.

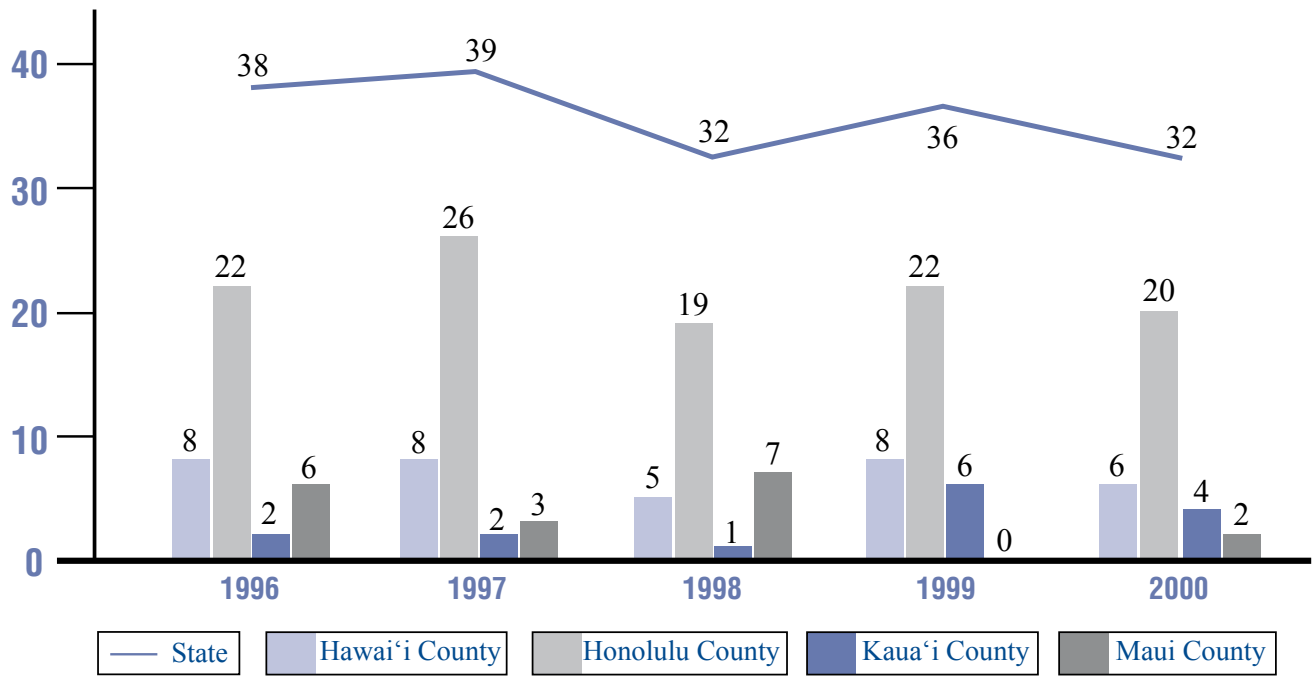
(Falls that occurred on weekends are indicated by blue shading.)



Drownings:

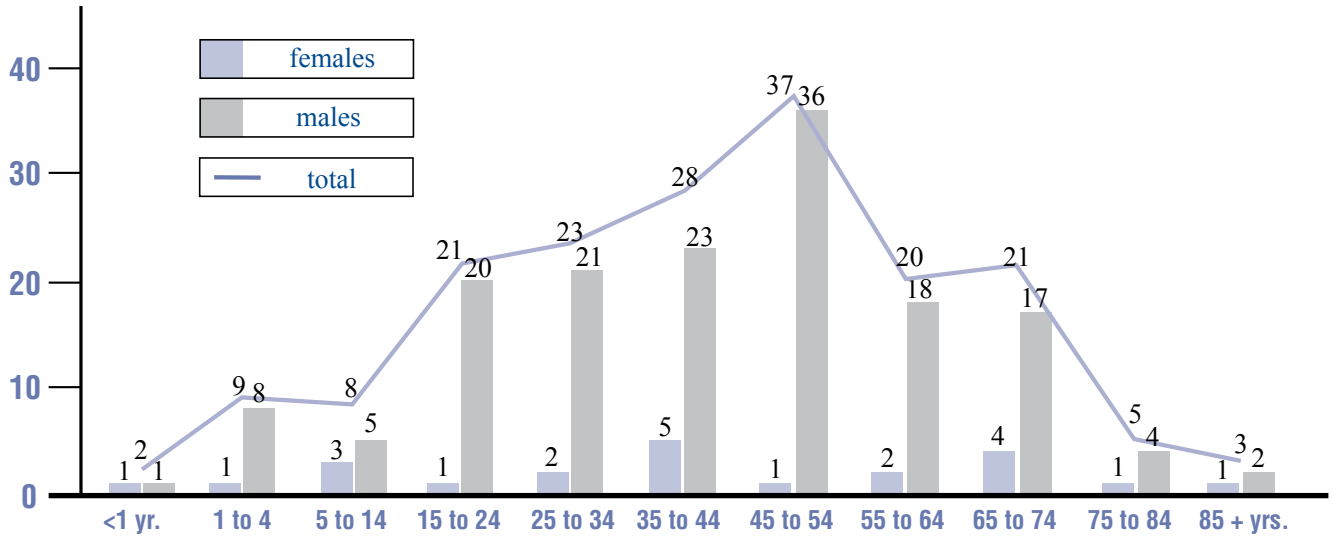
Drownings were the 3rd leading cause of unintentional injury fatalities, behind only death among motor vehicle occupants and falls. There were anywhere from 32 to 39 drownings per year among state residents over the 1996-2000 period, with a total of 177 over the 5 years (Figure 72). Although the highest annual totals occurred in 1996 and 1997, there was no clear declining trend over the 5-year period. About two-thirds of the drownings (62%, or 109) occurred on the island of O'ahu, 35 (20%) on Hawai'i, 18 (10%) in Maui County (15 on the island of Maui, and 3 on Moloka'i), and 15 (8%) on Kaua'i. Most (66%, or 10) of the drownings on Kaua'i occurred in the 1999-2000 period. No other trends were noticed for the other counties.

Figure 72. Annual number of drownings among Hawai'i residents, by county, 1996-2000.



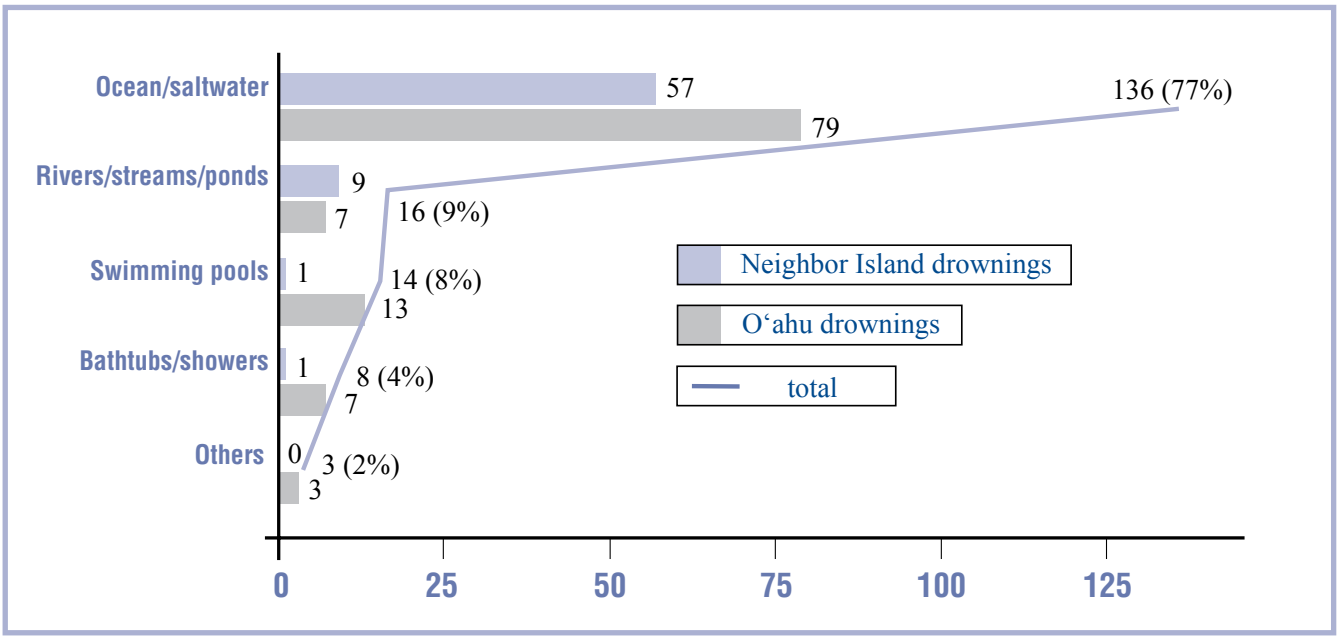
Drownings occurred at every age but were least common among children and in residents aged 75 years or older (Figure 73). Eighty-five percent (150) of the victims were between the ages of 15 and 74 years. The figure also shows that most (88%, or 155) of the victims were males. The proportion of female victims was greatest in the youngest and oldest age ranges.

Figure 73. Age and gender distribution of resident drowning victims in Hawai'i, 1996-2000.



More than three quarters (77%, or 136) of the victims drowned in the ocean or other saltwater environments such as canals or harbors (Figure 74). Sixteen others drowned in bodies of freshwater (13 in rivers and streams, and 3 in ponds). Fourteen (8%) drowned in swimming pools, and only 1 of those drownings occurred on the Neighbor Islands (on Maui). Eight other victims drowned in bathtubs or showers, including 7 on the island of O'ahu. Proportionally more of the drownings on the Neighbor Islands occurred in saltwater environments (83%, or 57), compared to drownings on O'ahu (72%, or 79). More of the O'ahu drownings occurred in swimming pools. More than half of the freshwater drownings occurred on the Neighbor Islands. (The "other" environments include a bucket of water, a water hazard at a golf course, and a maintenance facility at a water amusement park.)

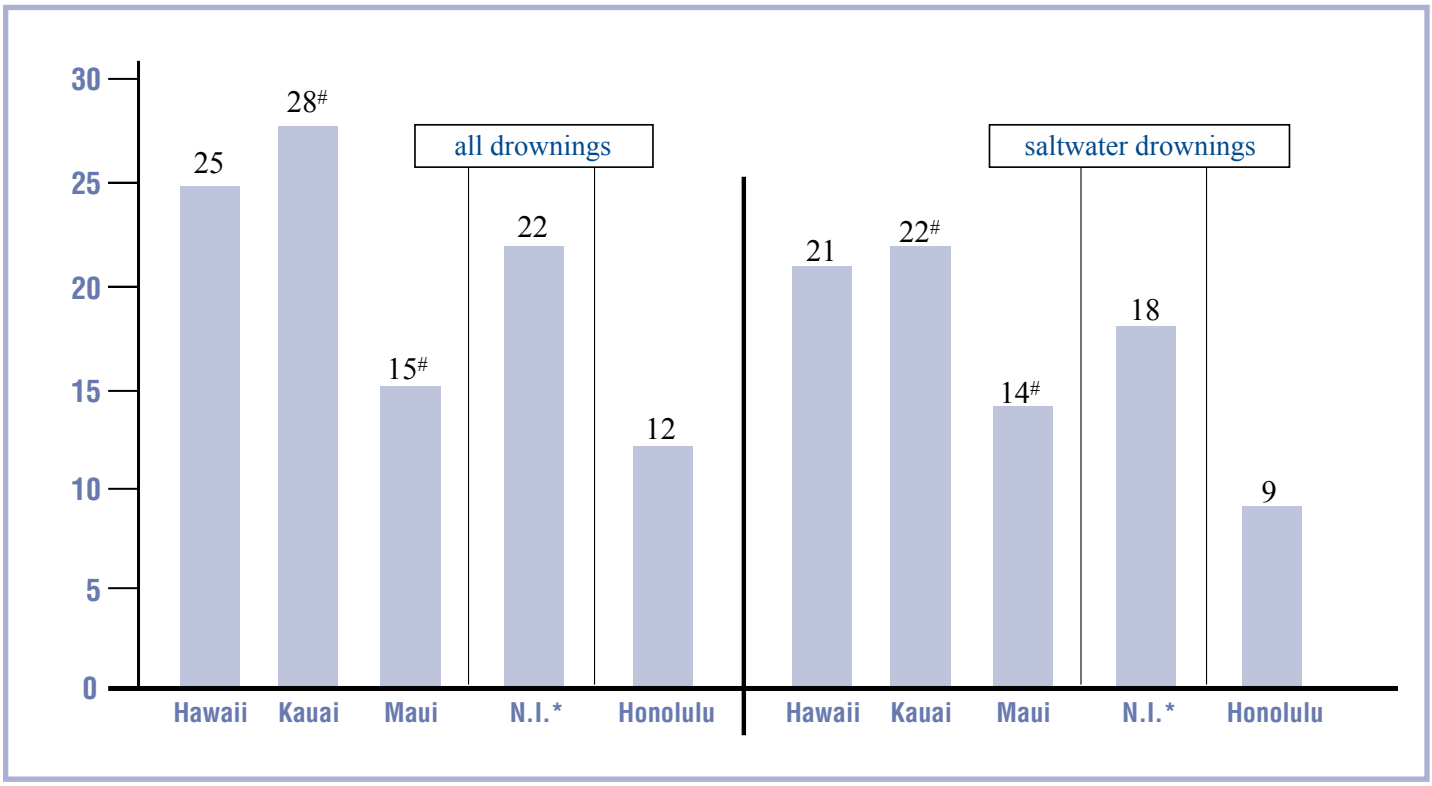
Figure 74. Drownings of Hawai'i residents, by environment and location, 1996-2000.



Although the majority of the drownings occurred in Honolulu County, Figure 75 shows that the overall rates of drowning among Neighbor Island residents was nearly double the rate among O'ahu residents (22/100,000 residents, vs. 12/100,000). Particularly high rates were noted for residents of Hawai'i and Kaua'i, although the latter calculation was based on only 15 deaths. This rate difference between Neighbor Island counties and Honolulu is even more pronounced when only saltwater drownings are considered (right side of Figure 75), since drownings in swimming pools were largely confined to Honolulu County. The higher risk of drowning for Neighbor Island residents was apparent in all but the youngest (ages 0 to 4) and older (60 years and older) age groups, although these comparisons are limited by the low number of victims.

Figure 75. Rate of all types of drownings (left side) and saltwater drownings (right side) among Hawai'i residents, by county of injury, 1996-2000.

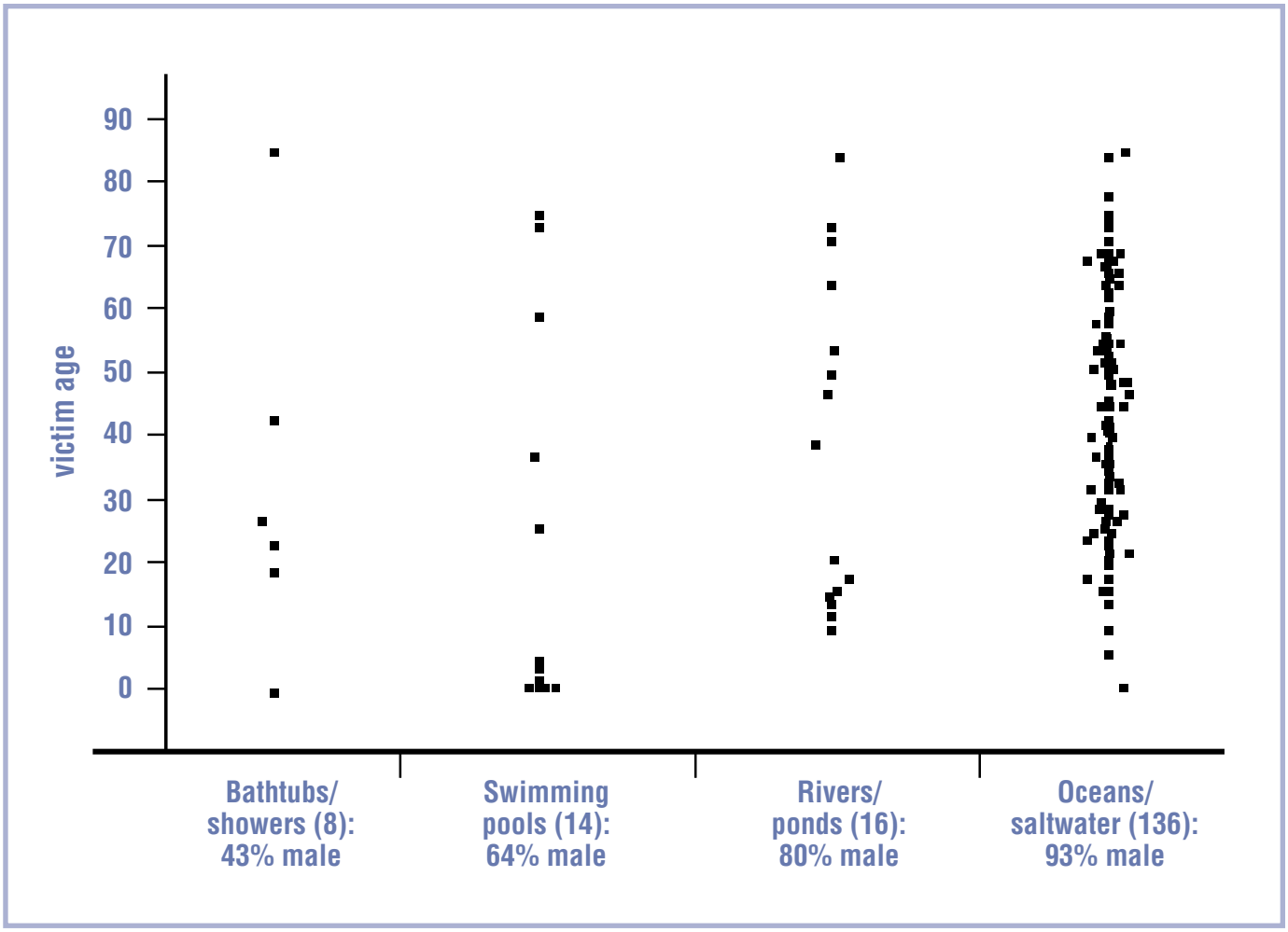
(Rate is per 100,000 residents, age-adjusted to the 2000 U.S. population distribution.)



N.I. = Neighbor Islands (combined totals for Hawai'i, Kaua'i, and Maui counties.)
#Denotes unreliable rate estimate, since it was based on low number of deaths.

Victim gender and age also differed somewhat by the type of drowning (Figure 76). Females comprised a significant proportion of victims who drowned in bathtubs (50%, or 4) and swimming pools (36%, or 5%), but only 7% (9) of the 136 victims who drowned in saltwater environments. Nearly half (43%, or 6) of the 14 victims who drowned in swimming pools were 1-year-olds, and 3 others were between 2 and 5 years of age. Drownings in bodies of freshwater included a large proportion of adolescents and young adults; half (47%, or 8%) were between 10 and 21 years of age. Almost all (98%, or 133) of the 136 victims of saltwater drownings were 14 years of age or older. The age of most of these victims (90%, or 123) was evenly distributed over the 20 to 74 year age group.

Figure 76. Drownings among Hawai'i residents, by environment, age, and gender of the victims, 1996-2000.

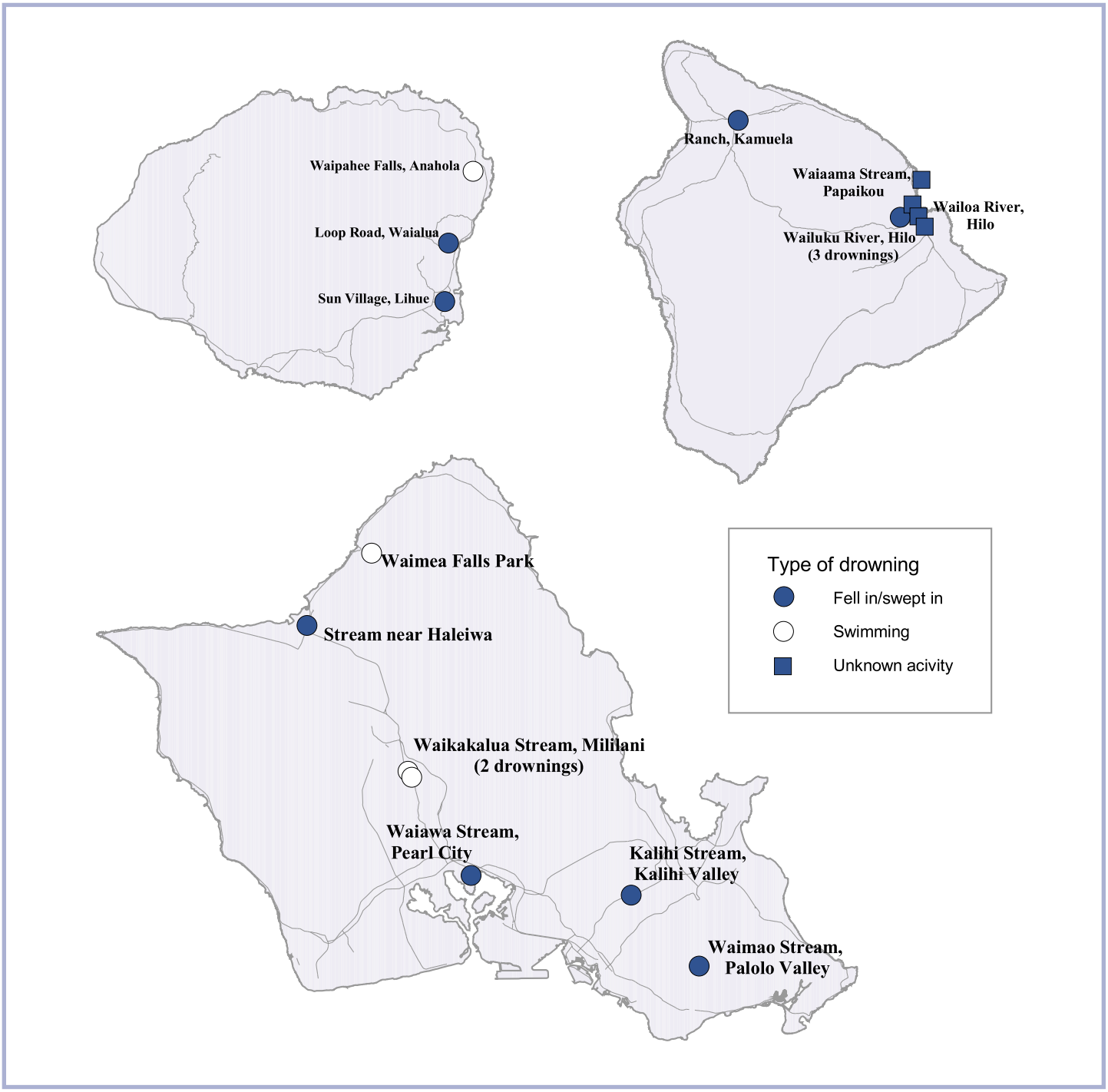


Most of the drownings that occurred in bathtubs or showers involved mitigating factors. The 3 oldest victims were found to have circulatory diseases that probably (1 case) or possibly (2 cases) contributed to their drownings, according to Honolulu Medical Examiner (ME) records. Methamphetamine use and acute alcohol intoxication were cited as contributing factors to the 2 drownings among younger adults. Another victim was thought to have had a seizure while in the bathtub, and another drowned in a scene "suggestive of sexual asphyxia".

Most (79%, or 11) of the 14 drownings in swimming pools occurred in home pools. Two others were at public facilities, and 1 was in a hotel pool. Most (71%, or 10) of the victims were thought to have had unintentional immersions into the pools, including obviously the 7 victims who were 2 years old or younger, and the 3 oldest victims. The two oldest victims were known to be non-swimmers, and the third older victim had not swum since having a debilitating stroke. Only 3 of the victims were thought to have intentionally entered the pools. (This information was not available for the remaining victim, but since that person was known to be a non-swimmer, that drowning was also likely due to an unintentional immersion.)

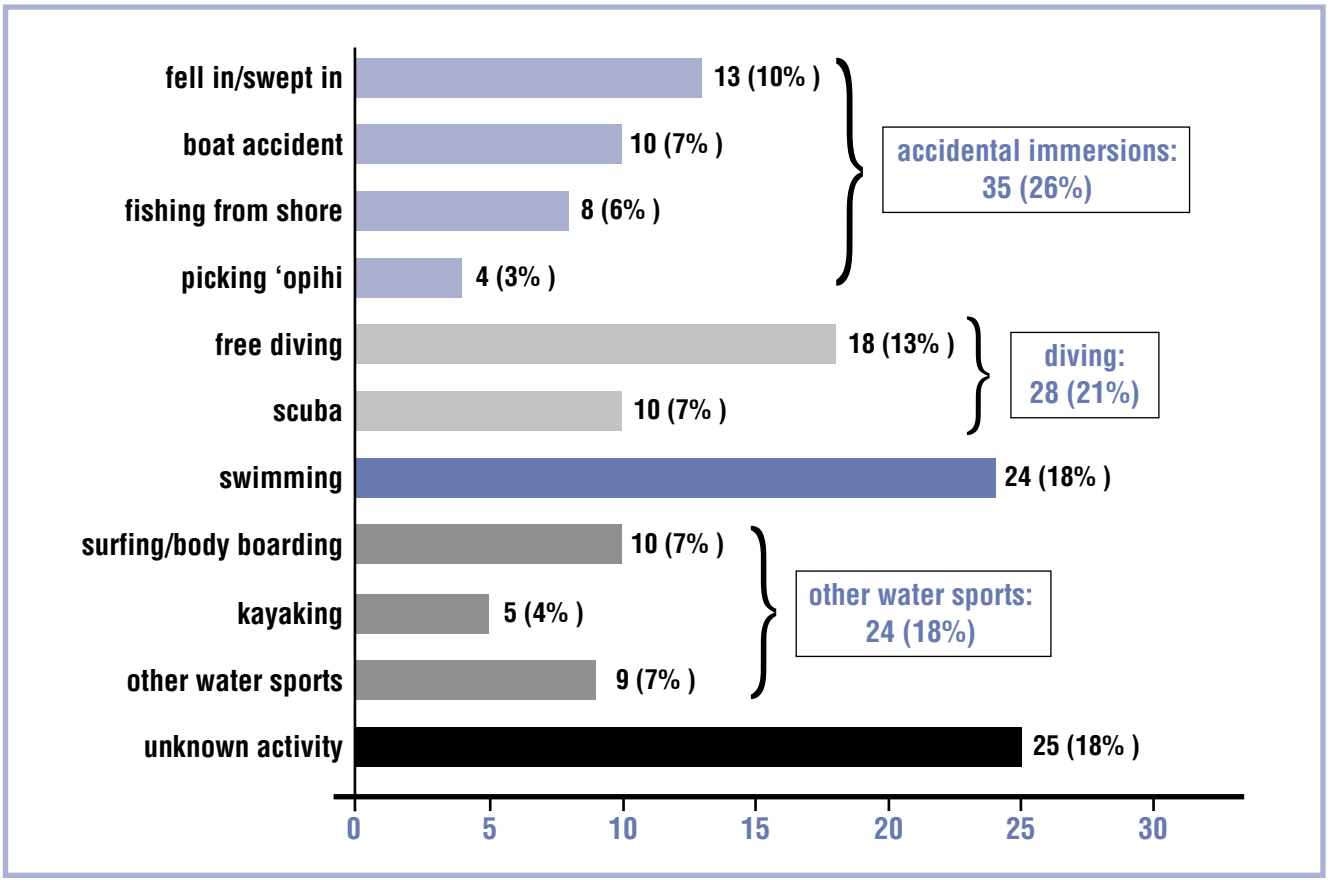
More than one-third (38%, or 6) of the 16 freshwater drownings occurred on the island of Hawai‘i (Figure 77), although only about 12% of the population resides on that island. Most (4) of those victims drowned in the Hilo area, including 3 who drowned in the Wailuku River. The 3 freshwater drownings on Kaua‘i occurred along the eastern side of the island, while the 7 drownings on O‘ahu occurred in many different parts of the island. There were no river drownings in Maui County over the 5-year period. The figure also shows that half (8) of the victims drowned after falling into or being swept into rivers and streams. Only 4 were known to have had a voluntary entry into the water. (This status was unknown for the other 4 victims.) According to Medical Examiner records, none of the 7 O‘ahu victims had been drinking at the time of the drowning, and only 1 had a positive drug screen. Two of these victims suffered traumatic injuries before their immersions.

Figure 77: Freshwater drownings among Hawai‘i residents, by island, 1996-2000.



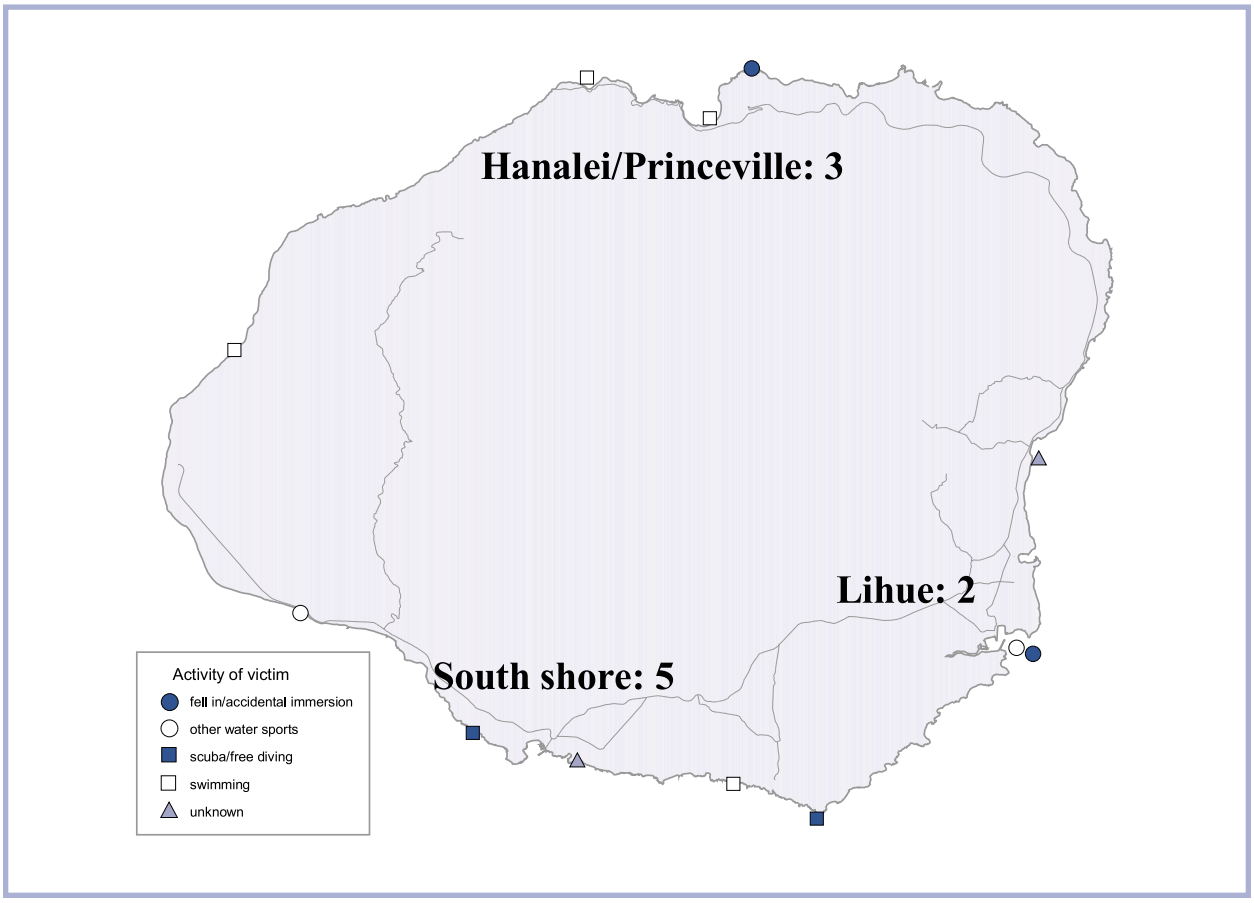
Unintentional immersions were responsible for about one quarter of the 136 drownings in the ocean or other saltwater environments (Figure 78). Most commonly, these victims fell in or were swept in from shore while not engaged in any specific activity. Another 10 drowned after boat accidents, 8 were fishing from the shore, and 4 were swept out while picking ‘opihi. Twenty-eight of the drownings were diving-related, and most of those (64%, or 18) were among "free" divers (i.e. those not using scuba equipment). Swimming was the single most common activity among the victims.

Figure 78. Saltwater drownings among Hawai‘i residents, by activity of victim, 1996-2000.



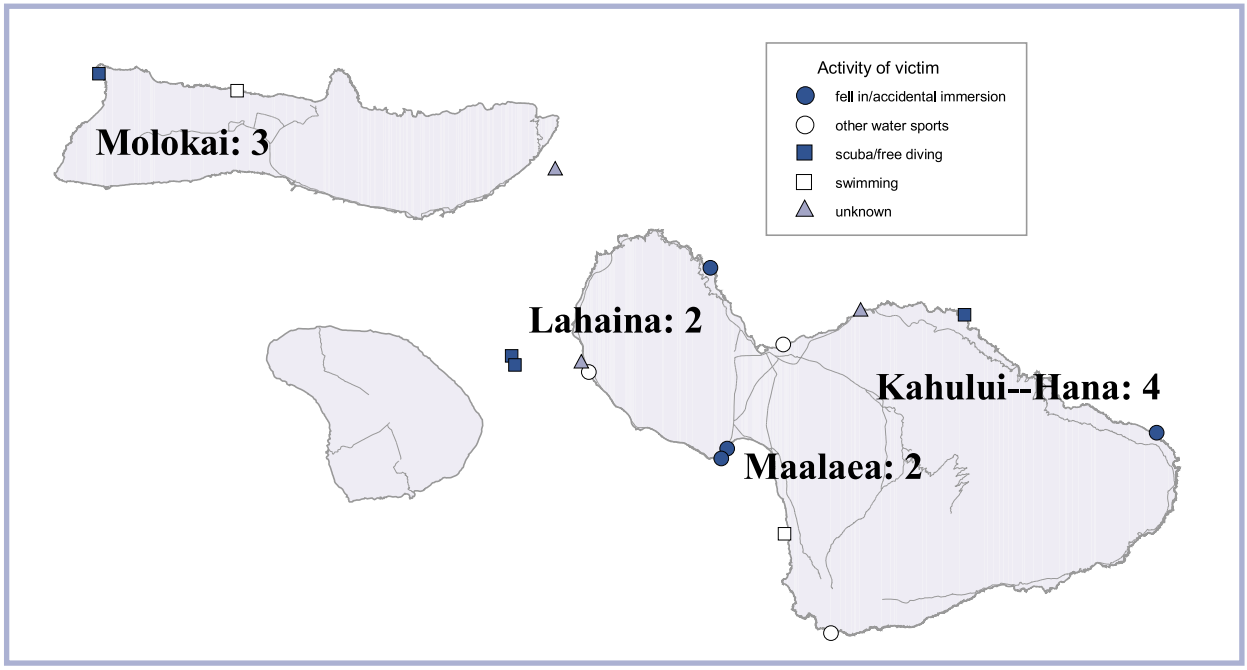
The following maps show the approximate geographic location of the saltwater drownings in each county, symbolized by the activity the victim was engaged in. The 12 drownings on Kaua‘i occurred in nearly all parts of the island, with no clear geographic cluster (Figure 79). There were no resident drownings along the Nā Pali Coast during this period, although there was 1 drowning at Polihale Beach.

Figure 79. Locations of drownings on Kaua‘i, by activity of victim, 1996-2000.



Likewise, there was little geographic clustering of the 13 saltwater drownings on the island of Maui, or the 3 on Moloka‘i (Figure 80). The highest concentrations were 2 drownings each in the Lahaina and Mā‘alaea areas.

Figure 80. Locations of drownings in Maui County, by activity of victim, 1996-2000.



The highest number of drownings on the island of Hawai‘i were on the Kona Coast (7 drownings), in the Hilo area (5), and in the Puna district (7) (Figure 81). Most (5) of the 9 drownings from accidental immersions occurred in the Hilo area (2) or the Puna district (3). The 5 drownings among divers occurred all around the island; 4 occurred among free divers. Compared to other islands, relatively few of these victims were swimming (3 victims) or engaged in sports other than diving (1).

Figure 81. Locations of drownings in Hawai‘i County, by activity of victim, 1996-2000.

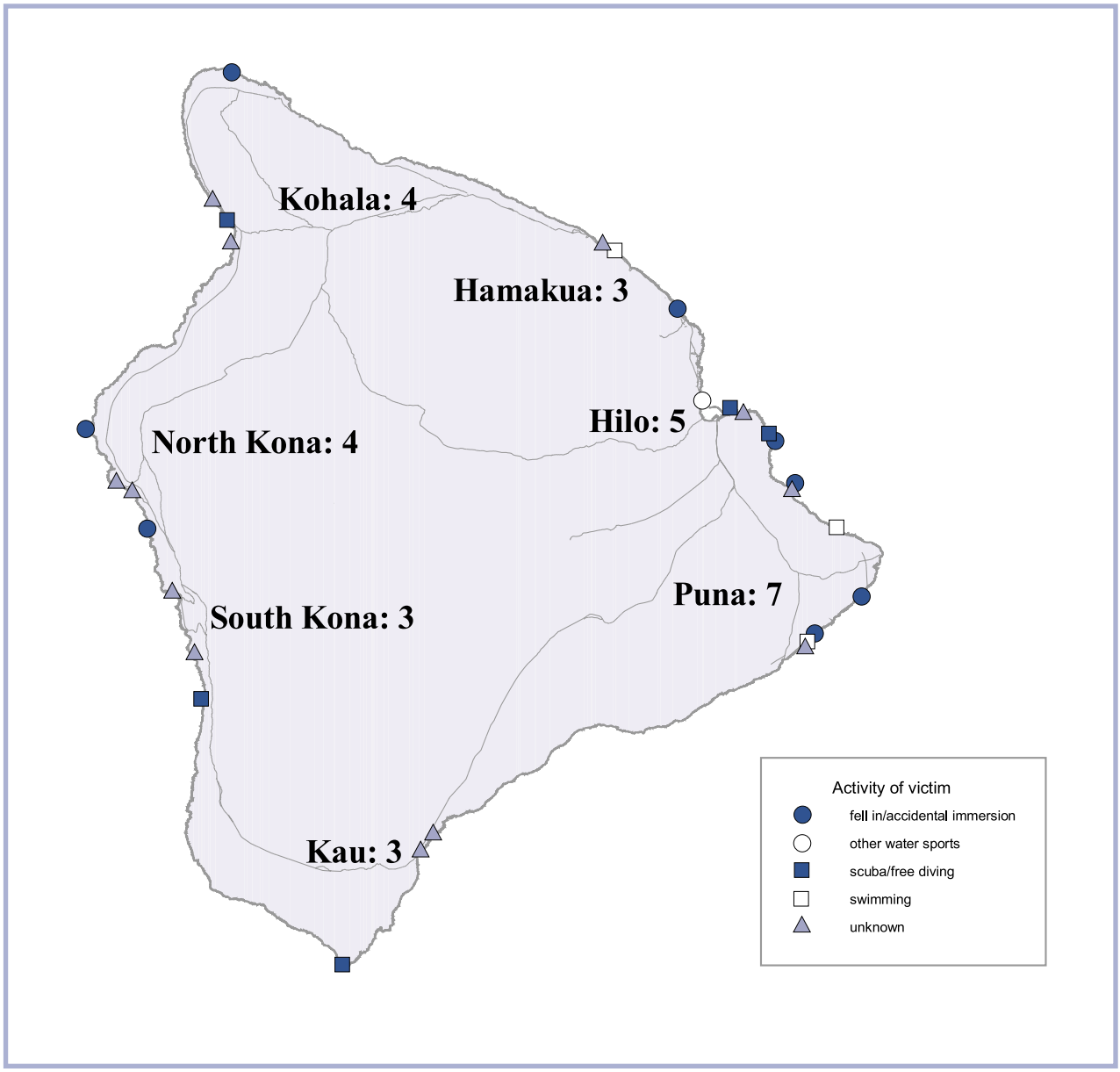


Figure 82 shows the saltwater drownings on O‘ahu were widely dispersed. About the only stretches of coastline with no or few drownings were the Barber’s Point to ‘Ewa Beach area, and the Hau‘ula and Kahalu‘u coasts on the windward (northeast) side. Almost half (48%, or 38) of the drownings occurred in the urbanized section stretching from Downtown to Diamond Head (20 drownings), or along the eastern end of the island from Kāhala to Makapu‘u (18). Those are shown more clearly in the close up of Figure 83.

Figure 82. Locations of drownings on O'ahu, by activity of victim, 1996-2000.

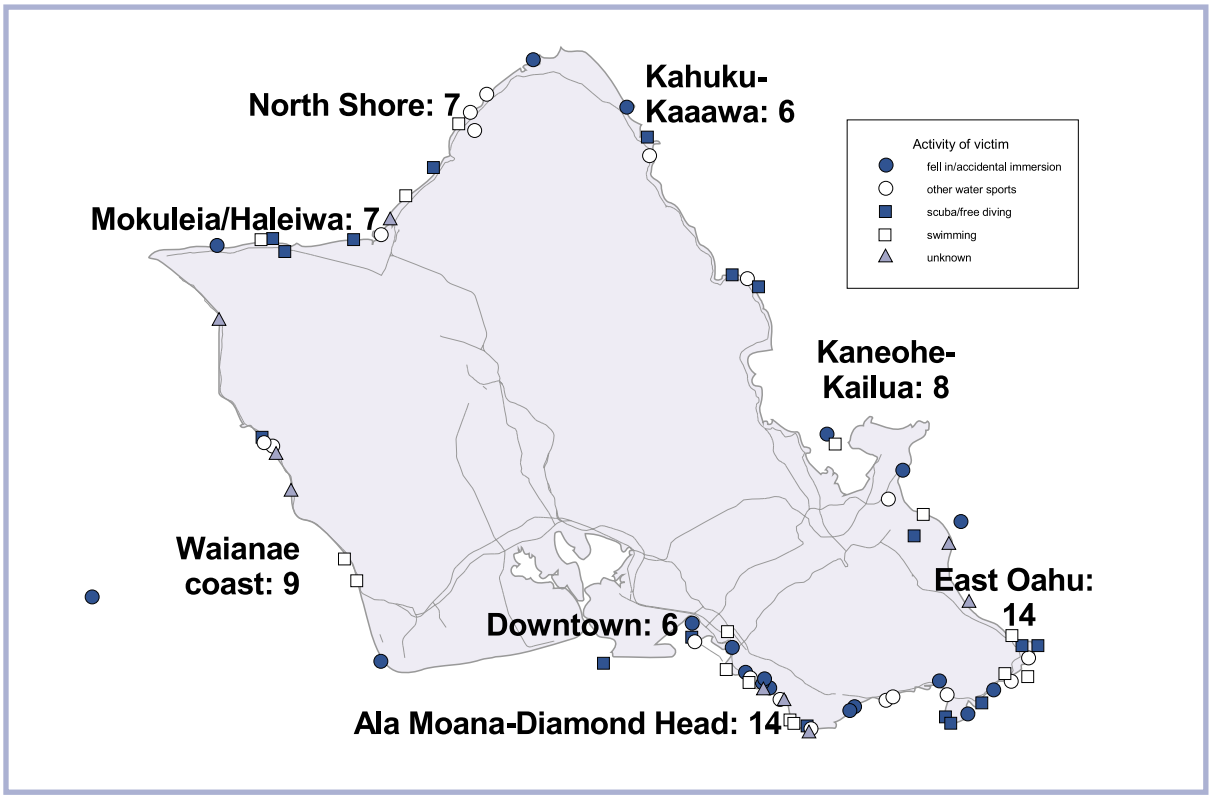
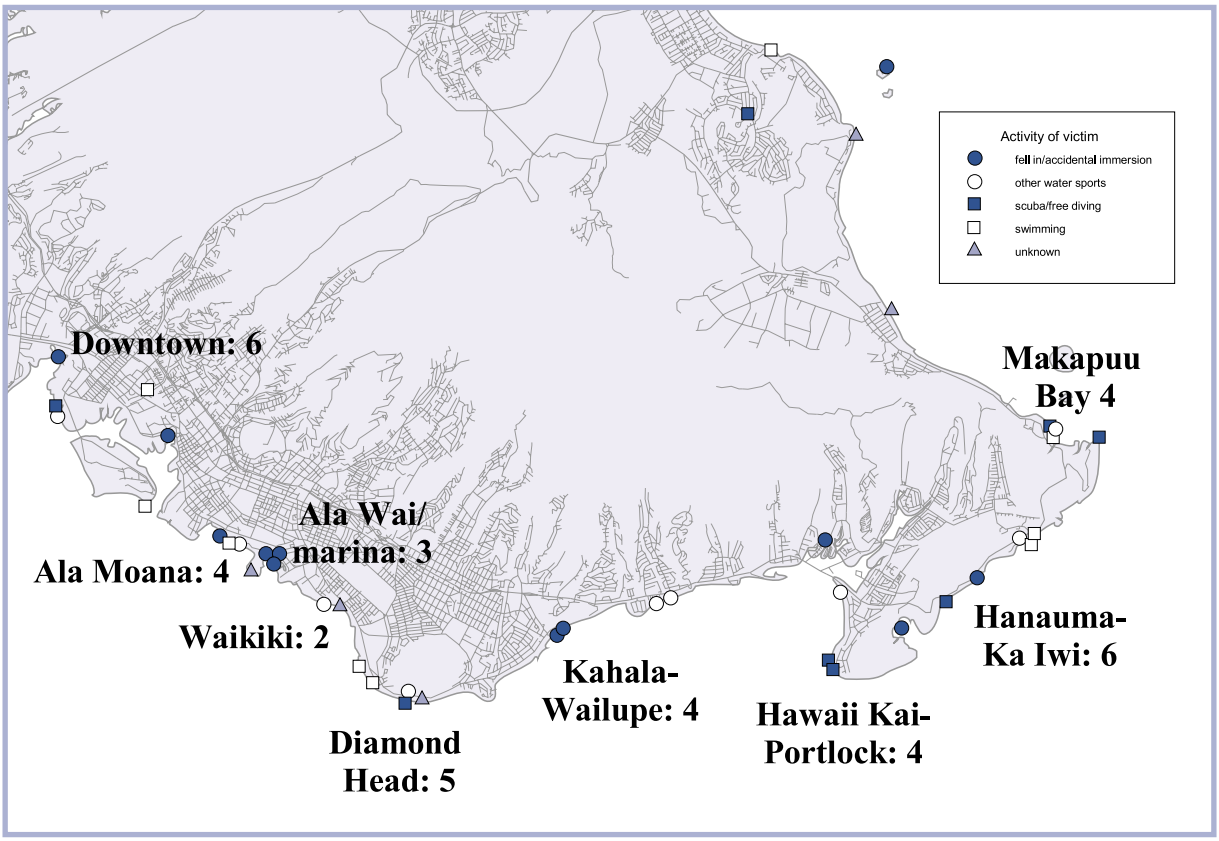


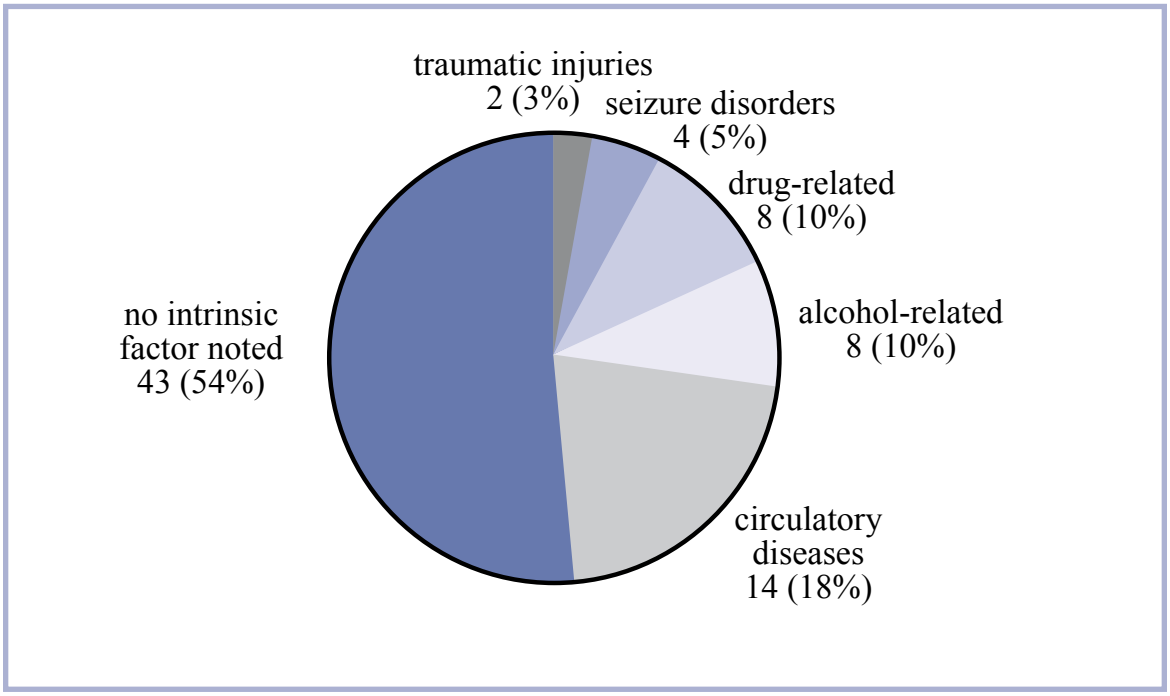
Figure 83. Locations of drownings in eastern O'ahu, by activity of victim, 1996-2000.



A number of mitigating factors were identified from Honolulu ME records which at least partially contributed to the 79 saltwater drownings on O'ahu: circulatory diseases, alcohol and drug use, seizure disorders, and traumatic injuries. These are factors which had nothing to do with the environment in which the person drowned, and are therefore referred to as intrinsic factors.

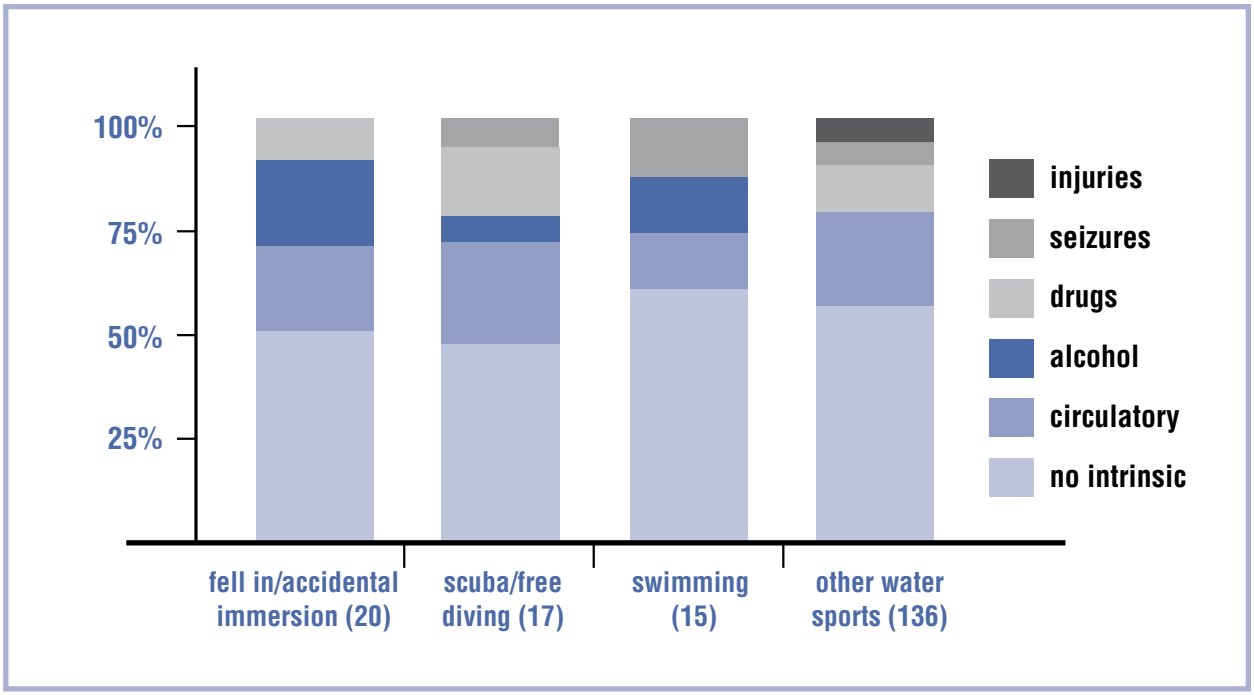
Intrinsic factors were involved in nearly half (46%, or 36) of the saltwater drownings on O'ahu over this period (Figure 84). The most common intrinsic factor was circulatory diseases, which contributed to 18% of the drownings. There were 13 victims with some form of heart disease, and 1 who had suffered a stroke. Alcohol and illicit drugs were detected in the blood of 10% of the victims. Methamphetamine was the most commonly screened drug; found in 6 of the 8 victims who tested positive for drugs. Four of the drownings were related to seizure disorders, and 2 other victims sustained traumatic injuries which led to their drownings.

Figure 84. Prevalence of intrinsic factors in saltwater drownings of Hawai'i residents, 1996-2000.



Intrinsic factors contributed to a significant proportion of all types of saltwater drownings, including at least half of those related to scuba or free diving and accidental immersions (Figure 85). (Not shown are the 9 drownings for which the activity of the victim was unknown; 3 of these drownings involved intrinsic factors.) Circulatory diseases played a significant role in drownings, especially those not related to swimming. Almost 1 of every 4 victims who drowned while diving or engaged in other water sports, or from an accidental immersion had circulatory problems that contributed to the drownings. Alcohol was a major factor in drownings due to accidental immersions, contributing to 1 in every 5 drownings of this type. The only other type of drowning that involved alcohol to a relevant degree was swimming, as 13% (2) of the 15 victims had been drinking prior to the drowning. Drug use was most common among victims who had been scuba or free diving, and also contributed to drownings of victims who fell into the water or who were engaged in other water sports. Seizures contributed to the drownings of 2 swimmers, 1 free diver, and 1 victim who had been surfing (other water sports).

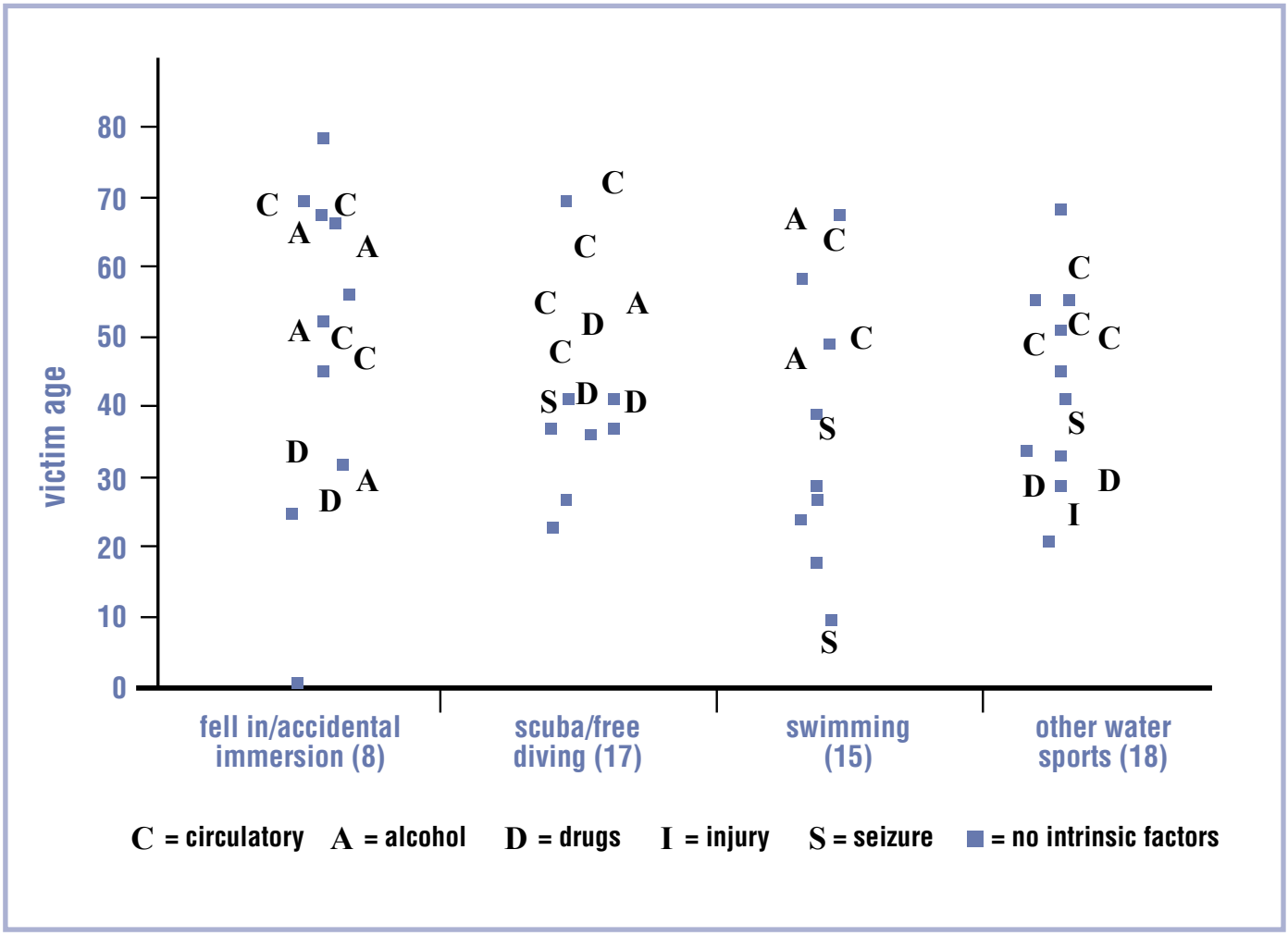
Figure 85. Prevalence of intrinsic factors in saltwater drownings among Hawai'i residents, by activity of victim, 1996-2000.



Intrinsic factors were involved in nearly half (46%, or 36) of the saltwater drownings on O'ahu. The most common intrinsic factor was circulatory diseases, which contributed to 18% of the drownings.

Figure 86 summarizes some of the associations between victim age and activity and the contribution of intrinsic factors to saltwater drownings in Honolulu County. (Not shown are the 9 drownings where the activity of the victim was not known.) All of the 14 victims with circulatory problems were middle-aged or older; all were 47 years or older. Circulatory problems contributed to at least half of the drownings of victims older than 45 years who were diving (4 of 7 victims), or engaged in other water sports (4 of 8 victims). Seven of the 8 victims who had consumed alcohol at the time of the drowning were between 46 and 66 years of age. All 8 victims had blood alcohol concentrations that exceeded the legal definition for driving under the influence of 0.08 gm/dl, and all but 1 had levels of 0.23 gm/dl or greater (i.e. 3 times the legal limit). The victims who tested positive for drug use were all in the 26 to 51-year age range. Drug and alcohol use contributed to half (3 of 6) of the drownings due to accidental immersions among victims aged 40 years or younger.

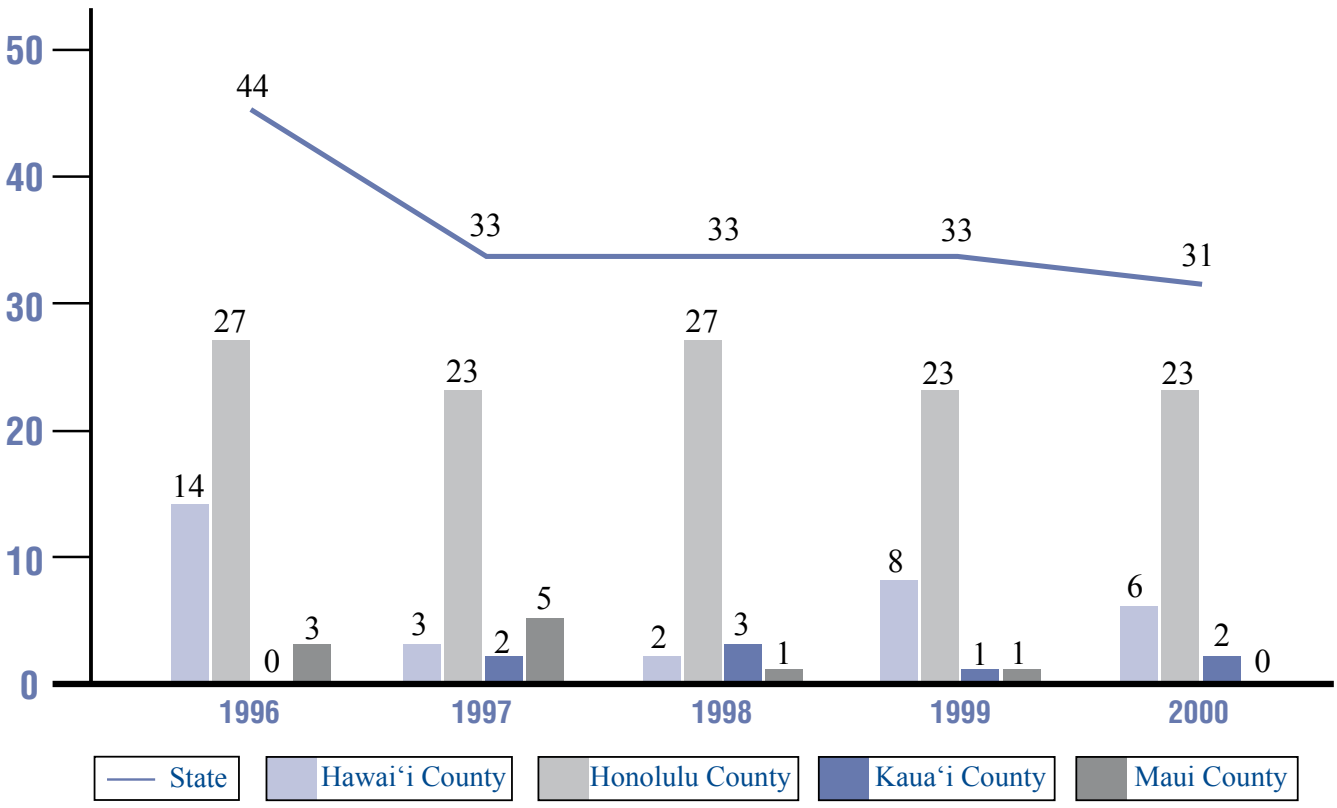
Figure 86. Intrinsic factors in saltwater drownings among Hawai'i residents, by age and activity of victim, 1996-2000.



Poisonings:

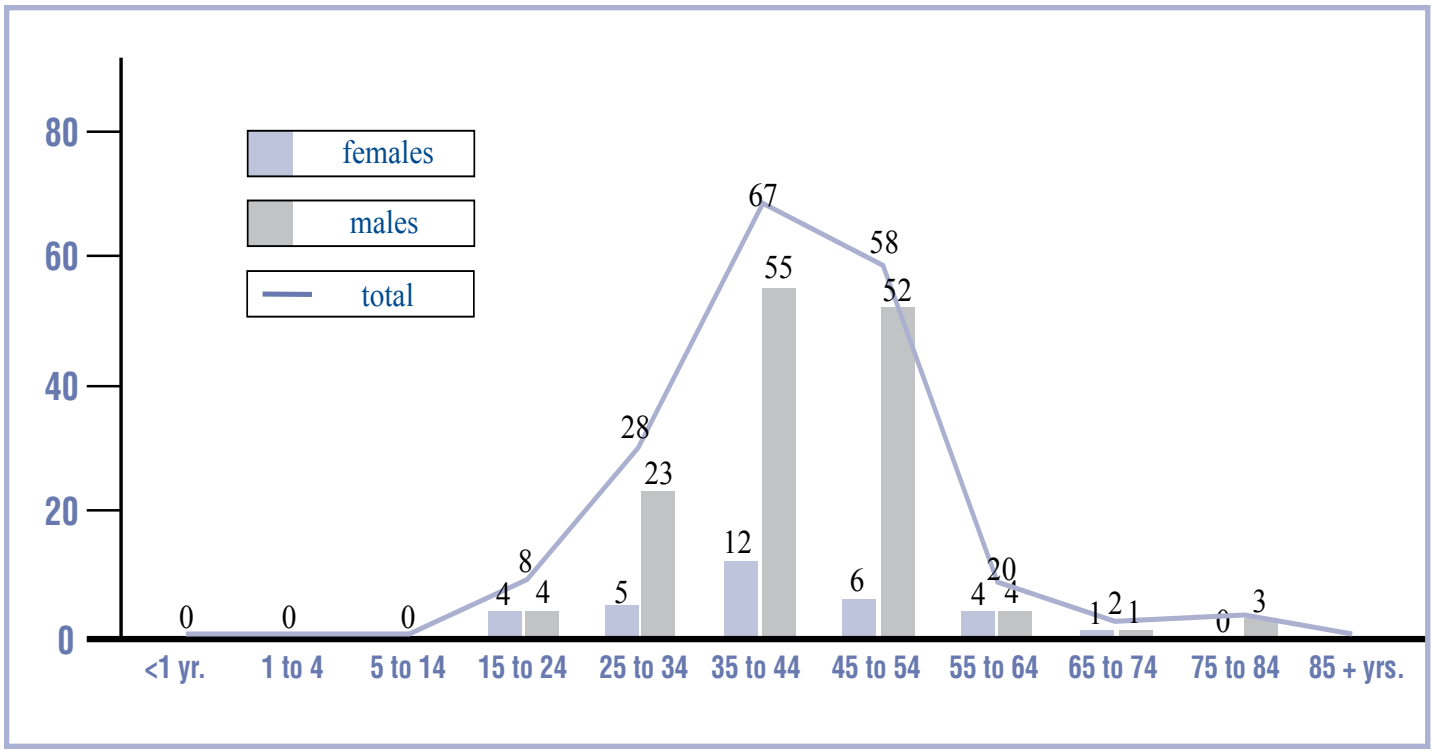
There were roughly the same number of fatal poisonings (174) over the 5-year period as drownings (177), making these the 3rd leading causes of unintentional injury fatalities in the state. Apart from the 44 fatal poisonings in 1996, the annual total was fairly constant from 31 to 33 deaths per year (Figure 87). However, trends are difficult to examine because poisonings make up a large proportion of injury deaths where the intent could not be established (see page xx), or they can often be classified as suicides. It is difficult to know the accuracy with which the intent was determined over the various years and across the 4 different counties. Seventy-one percent (123) of the poisonings were on O‘ahu, and 19% (33) were on the island of Hawai‘i.

Figure 87. Annual number of fatal poisonings among Hawai‘i residents, by county, 1996-2000.



Compared to most injury categories, the age distribution of poisoning victims were relatively narrowly distributed between the ages of 25 and 54 years (Figure 88), with an average age of 42 years. Eighty-eight percent (153) of the 174 victims were within this 30-year age range; 75% (131) were between 30 and 50 years of age. There was only 1 victim younger than 20 years of age. Figure 88 also shows that most (82%, or 142) of the poisoning victims were male.

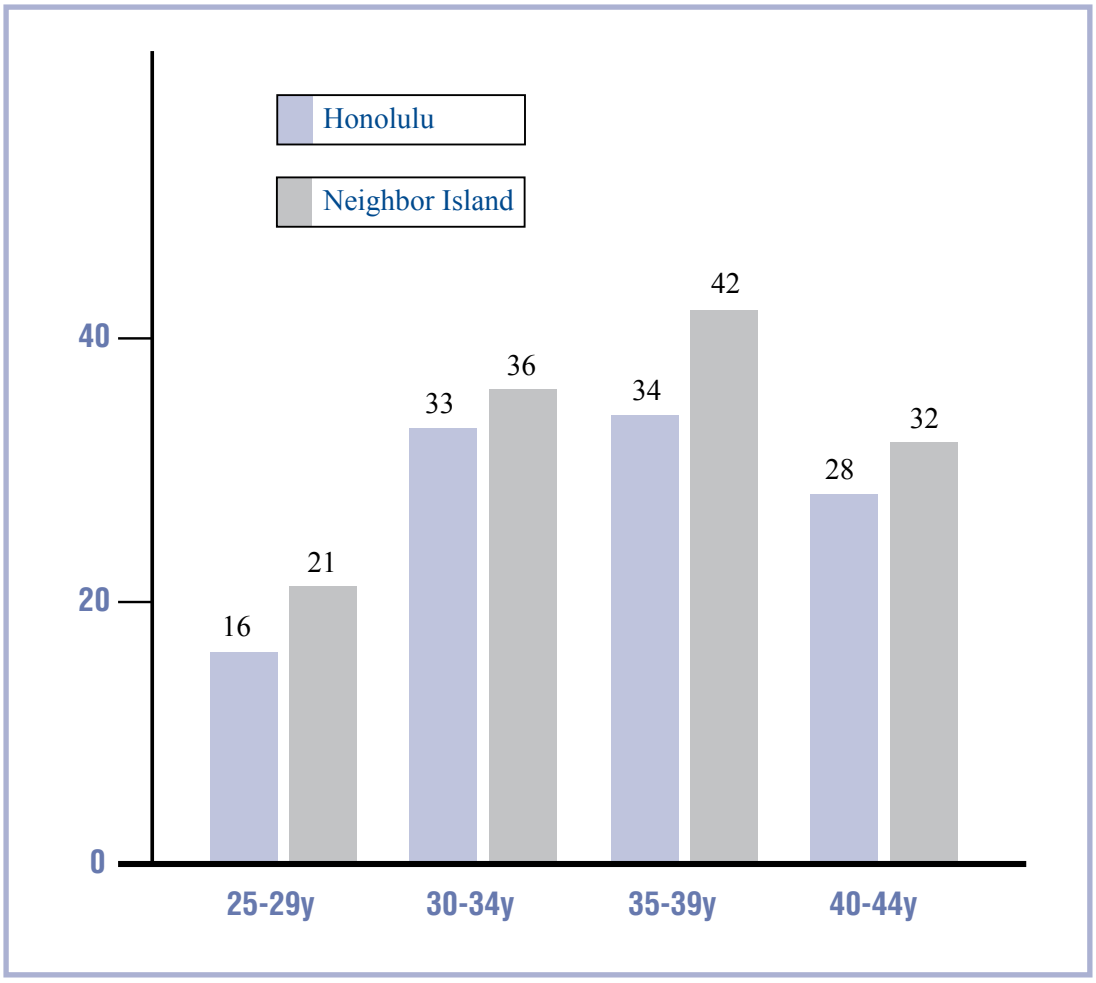
Figure 88. Age and gender distribution of poisoning victims in Hawai'i, 1996-2000



...the age distribution of poisoning victims was relatively narrowly distributed between the ages of 25 and 54 years...

Figure 89 shows that the rate of fatal poisonings increased over the 25 to 54 year age range on both O‘ahu and the Neighbor Islands. All but 7 of the 153 poisonings among victims of this age range were due to drugs. The age-specific rates were slightly higher among residents of Neighbor Islands, compared to O‘ahu.

Figure 89. Five-year rates (/100,000) of fatal poisonings among residents of O‘ahu and Neighbor Islands, by age group, 1996-2000.

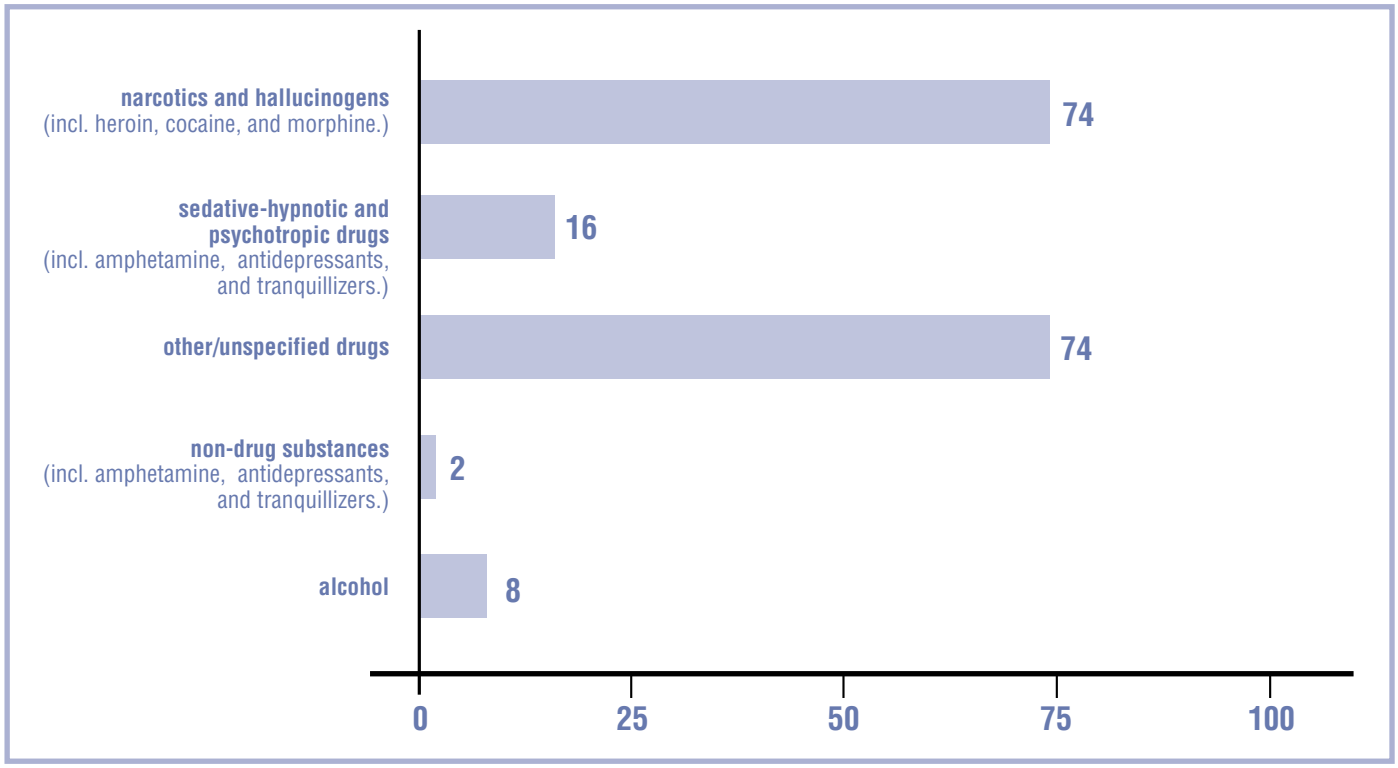


The summary rate (ages 25-54 years) is age-standardized across the 6 age categories, using the U.S. 2000 standard distribution.

Almost all (94%, or 164) of the fatal poisonings were drug-related (Figure 90). Seventy-eight were classified as "other" or "unspecified" drugs, but there were two other major categories: 1) narcotics, and 2) sedative-hypnotic and psychotropic drugs. The former category includes most of the illicit substances, like heroin, cocaine, and morphine. The latter category includes amphetamine, antidepressants, barbiturates, and tranquillizers.

Unfortunately, the adoption of the ICD-10 coding scheme in 1999 resulted in a loss of specificity regarding poisonous substances. Under ICD-10, for example, it is no longer possible to enumerate poisonings due to heroin or amphetamine, as those are grouped into broader categories in ICD-10. Projecting the 1996-1998 totals onto the 5-year period, however, yields the following estimates: 38 poisonings were from heroin, 25 from cocaine, and 10 from amphetamine. No clear differences in the types of poisonings were noted between victims from O‘ahu and those from the Neighbor Islands.

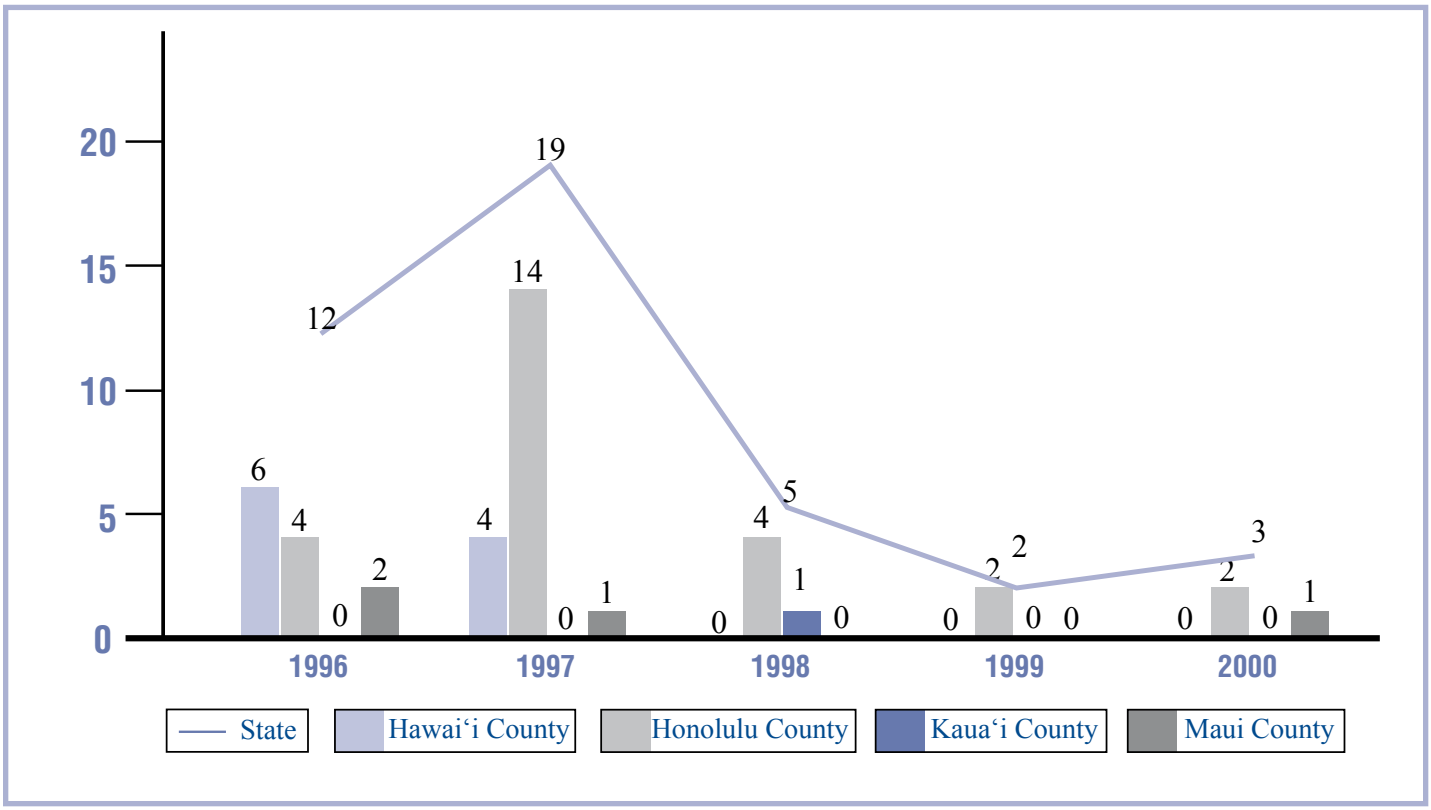
Figure 90. Fatal poisonings among Hawai‘i residents, by type, 1996-2000.



Fires:

There were 41 fatalities due to fires or burns over the 5-year period. Figure 91 shows that nearly half of them (46%, or 19) occurred in 1997, and another 29% (12) occurred in 1996. However, 7 of the deaths in 1997 were due to a single fire, and 7 of the 1996 deaths were due to 3 separate incidents. With relatively small numbers of fatalities such as these, it is difficult to determine if there is any kind of trend for deaths due to fires or burns, although it appears that the numbers of deaths and incidents decreased over the 5-year period. About two-thirds (63%, or 26) of the victims were residents of O‘ahu, 10 (24%) were from Hawai‘i, 4 (10%) from Maui County, and 1 victim was from Kaua‘i.

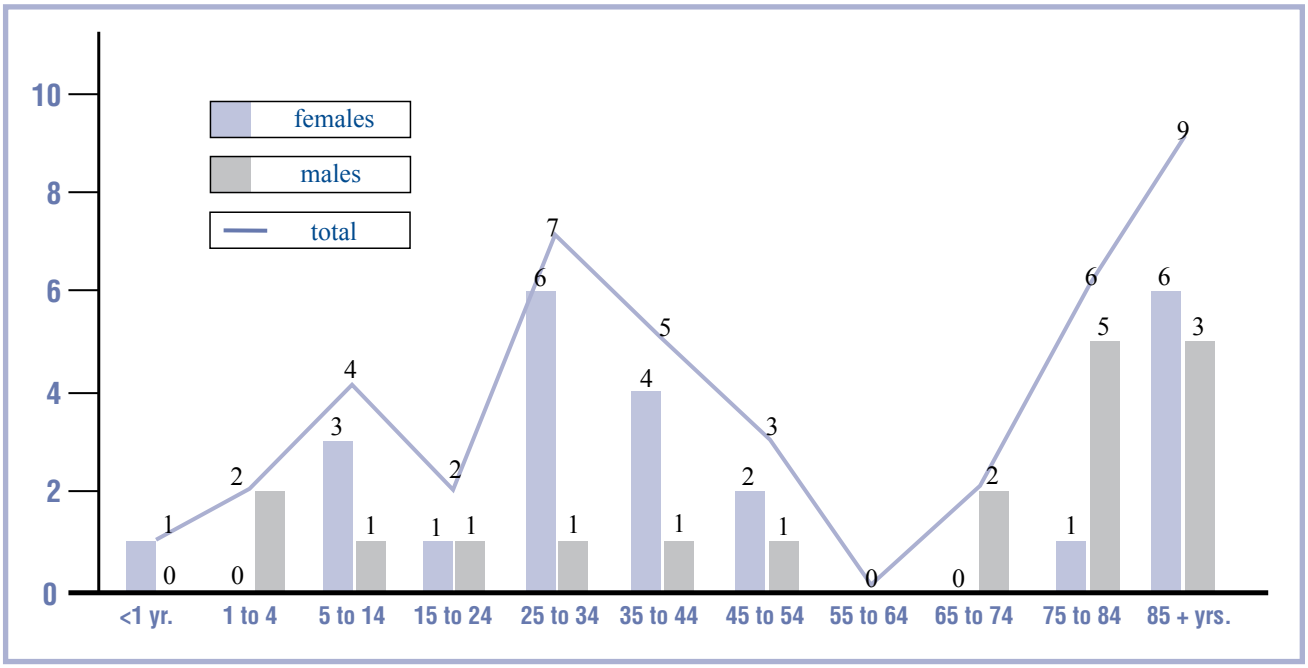
Figure 91. Annual number of fatalities from fires or burns among Hawai‘i residents, by county, 1996-2000.



Approximately one-third (16) of the 41 victims were killed in only 5 separate incidents:
1/96: 3 deaths from an industrial fire at an observatory on the summit of Mauna Kea, Hawai‘i
3/96: 2 deaths from a structural fire in Hawaiian Beaches, Puna, Hawai‘i
6/96: 2 deaths from a structural fire in the Punchbowl neighborhood of O‘ahu
5/97: 2 deaths from burns after a helicopter crash near Hāpuna Beach, South Kohala, Hawai‘i
10/97: 7 deaths from a structural fire in the neighborhood of Pālolo, O‘ahu

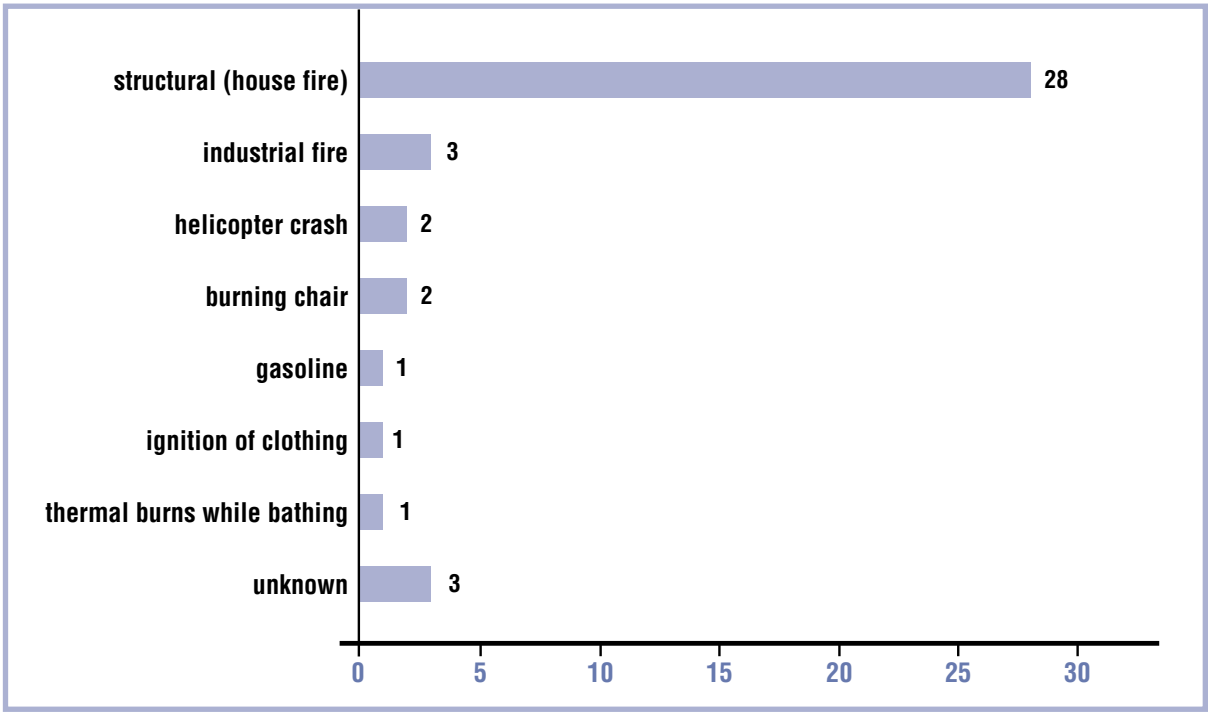
Figure 92 shows that the fatalities occurred over a wide age range. More than half (59%, or 24) of the victims were male.

Figure 92. Age and gender distribution of victims of fires and burns in Hawai'i, 1996-2000.



The majority (69%, or 28) of the fatalities resulted from structural fires, usually the victim's place of residence (Figure 93). There were 20 separate structural fires that caused the 28 fatalities, anywhere from 2 (1999) to 7 (1997) such fires per year. Ten of those 20 fires occurred from January through March. (Only 5 would be expected by chance alone.) There were no clear patterns as to the day of week these fires occurred, but more than half of them (10 of the 17 for which a time was known) occurred during the late night hours (between midnight and 5:00 am).

Figure 93. Fatalities from fires or burns among Hawai'i residents, by type, 1996-2000.



Suffocations:

There were 96 suffocations between 1996 and 2000, with a statistically significant upward trend over that time (Figure 94). The annual rate was estimated to increase by 18% (95% confidence interval: 2% to 36%). The most consistent increase was seen in victims aged 65 years or older, as the annual total generally increased from a low of 4 senior-aged victims in 1996 to 19 in 2000. Most (84%, or 81) of these injuries occurred on O‘ahu, 9 on Hawai‘i, 4 in Maui County, and 2 on Kaua‘i.

Figure 94. Annual number of fatal suffocations among Hawai‘i residents, by county, 1996-2000.

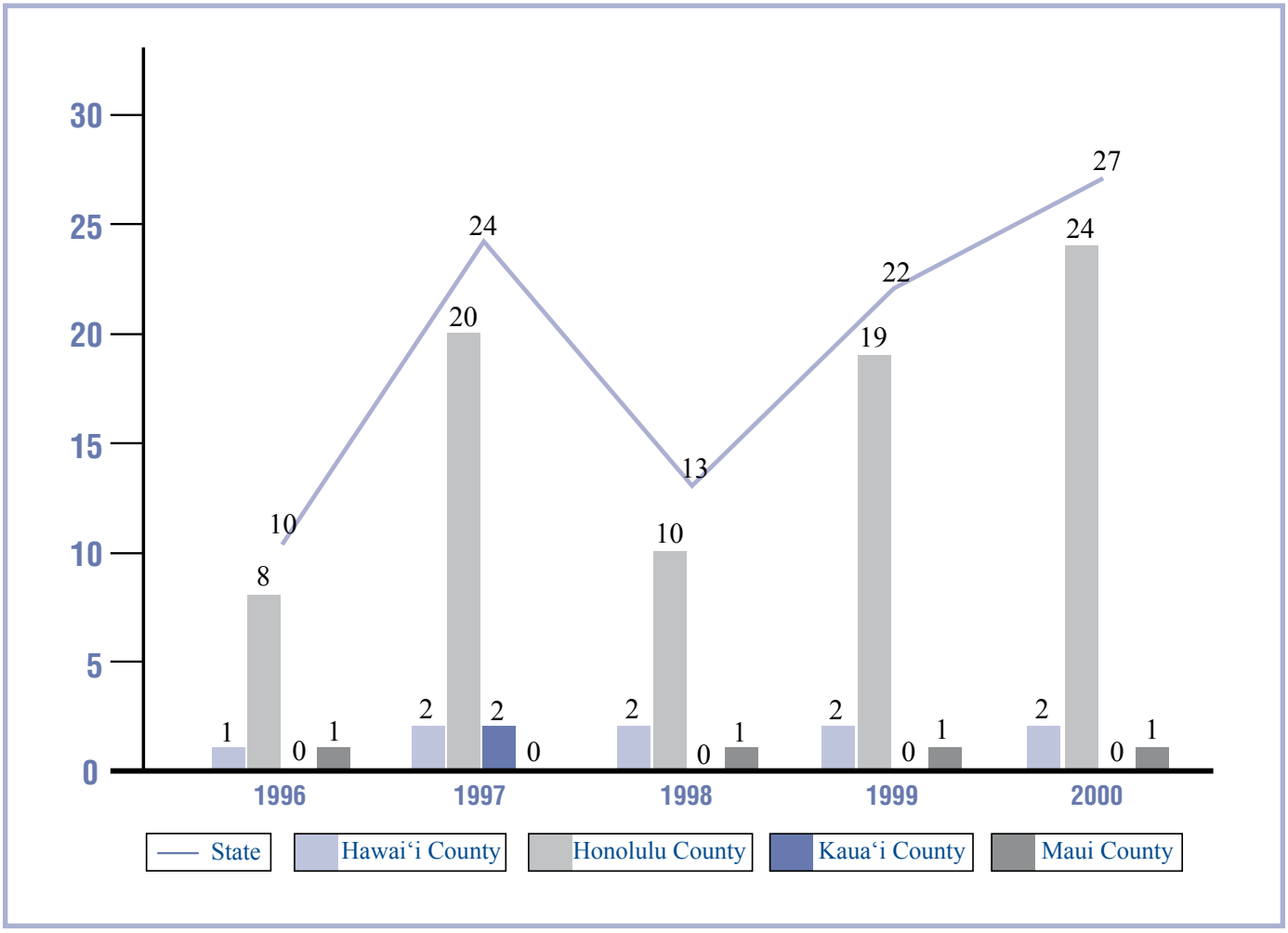
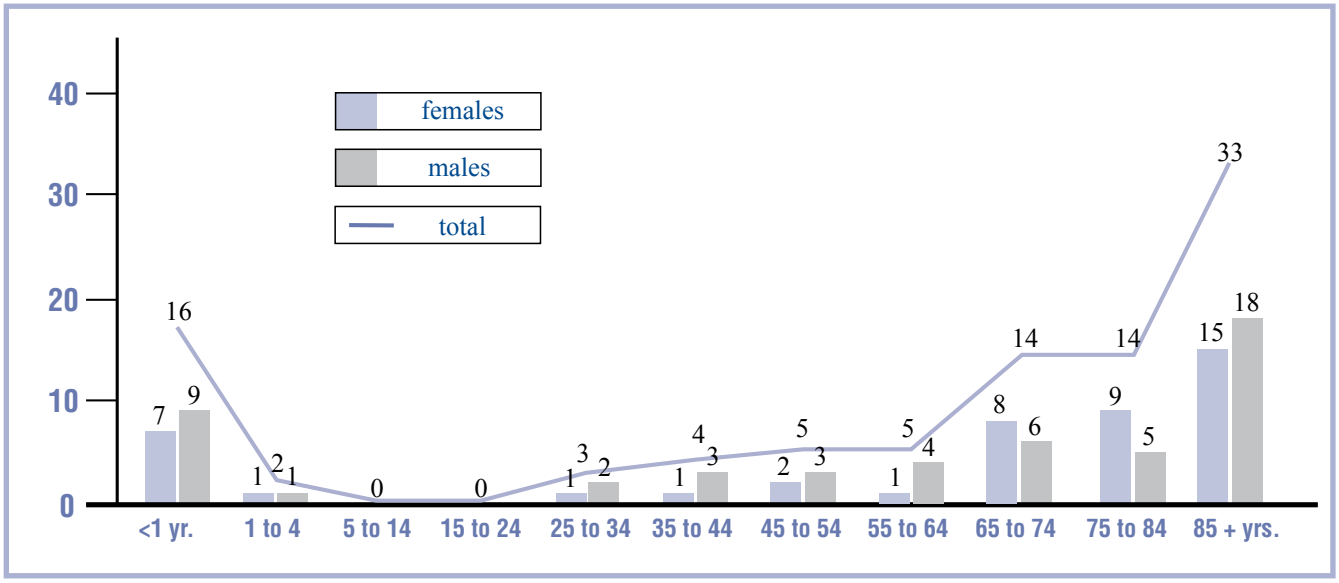


Figure 95 shows there were two predominant age groups among the suffocation victims: infants and those over age 65. Eighteen (23%) of the victims were either infants (16 victims) or 1 year-olds (2), and 61 (64%) were 65 years of age or older. The gender distribution was more equal than for most other injury outcomes: 53% male and 47% female.

Figure 95. Age and gender distribution of victims of suffocation in Hawai'i, 1996-2000.



About one-quarter (26%, or 25) of the suffocations were caused by the inhalation of food into the respiratory tract. No further details were given for 17 of those deaths, but 5 of the 8 remaining victims had choked on meat. The following food items were responsible for 1 fatality each: mochi, nuts, and popcorn and rice crackers. Another 8 (8%) of the victims suffocated from inhalation of their stomach contents. All but 1 of the 16 infant victims had suffocated in their bed or cradle. Finally, there were 42 deaths that were coded under "inhalation and ingestion of other objects...". There were few further details. A manual review of the death certificates for these victims indicated "aspiration" as a contributing cause of death in 17 of these cases. (Aspiration pneumonia was reported for 4 victims.)

Figure 96. Suffocations among Hawai'i residents, by type, 1996-2000.

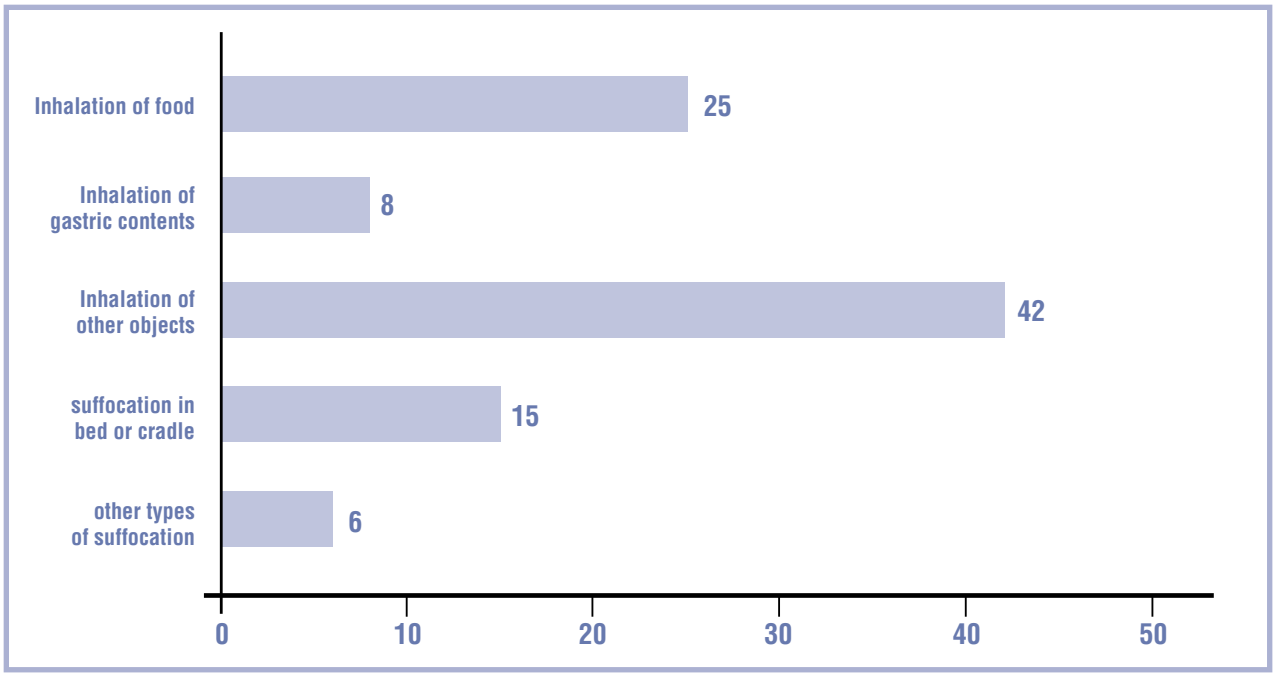
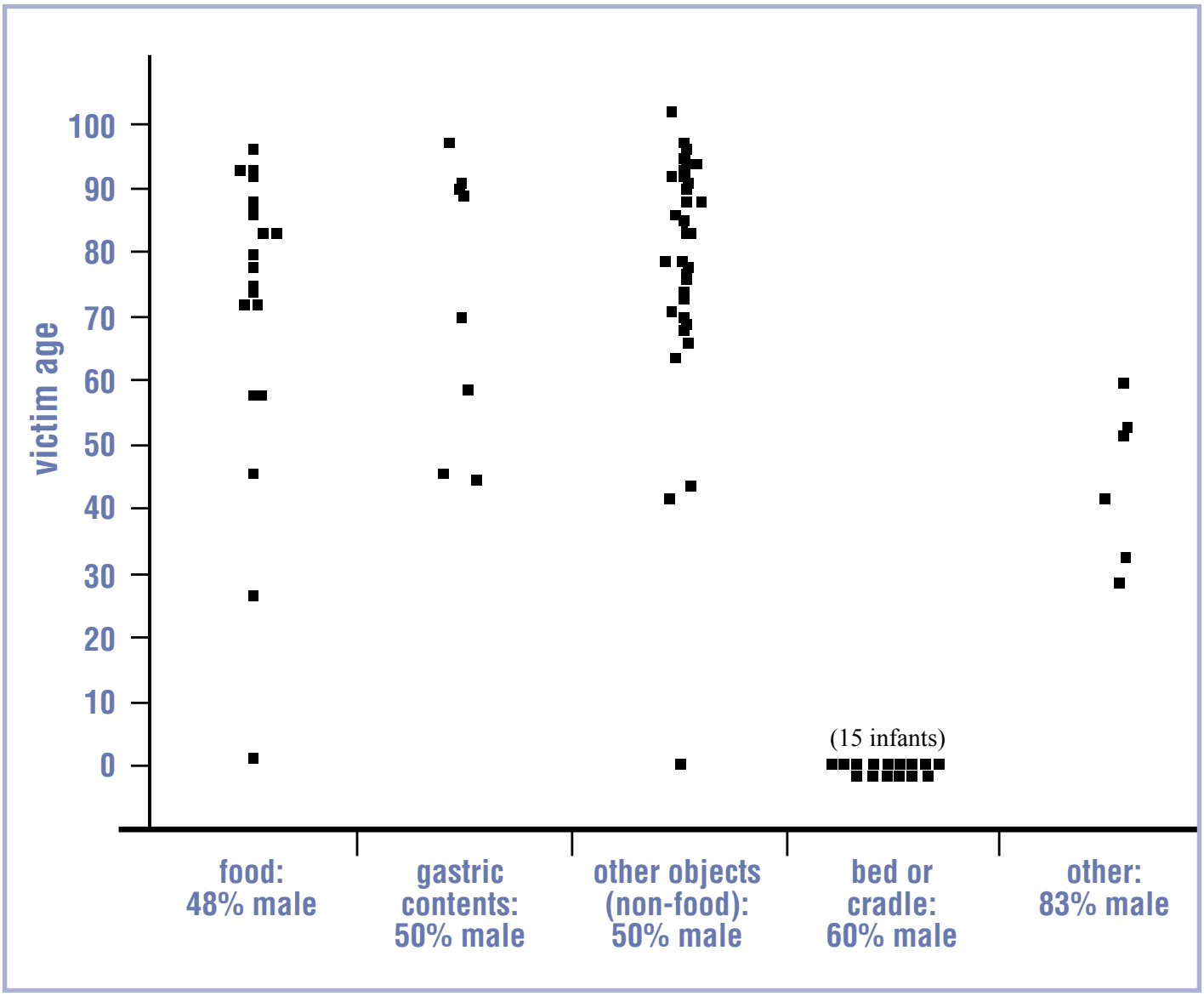


Figure 97 shows the relationships between age, gender and type of suffocation. Only 1 of the 25 victims who suffocated from food inhalation was younger than 26 years of age, and most (72%, or 18) were aged 70 years or older. A similar age distribution was seen for the 42 victims who inhaled "other" (non-food) objects; only 3 were under 60 years of age. The 6 victims of "other" types of suffocations were relatively young. Two of these were victims of unintentional strangulations.

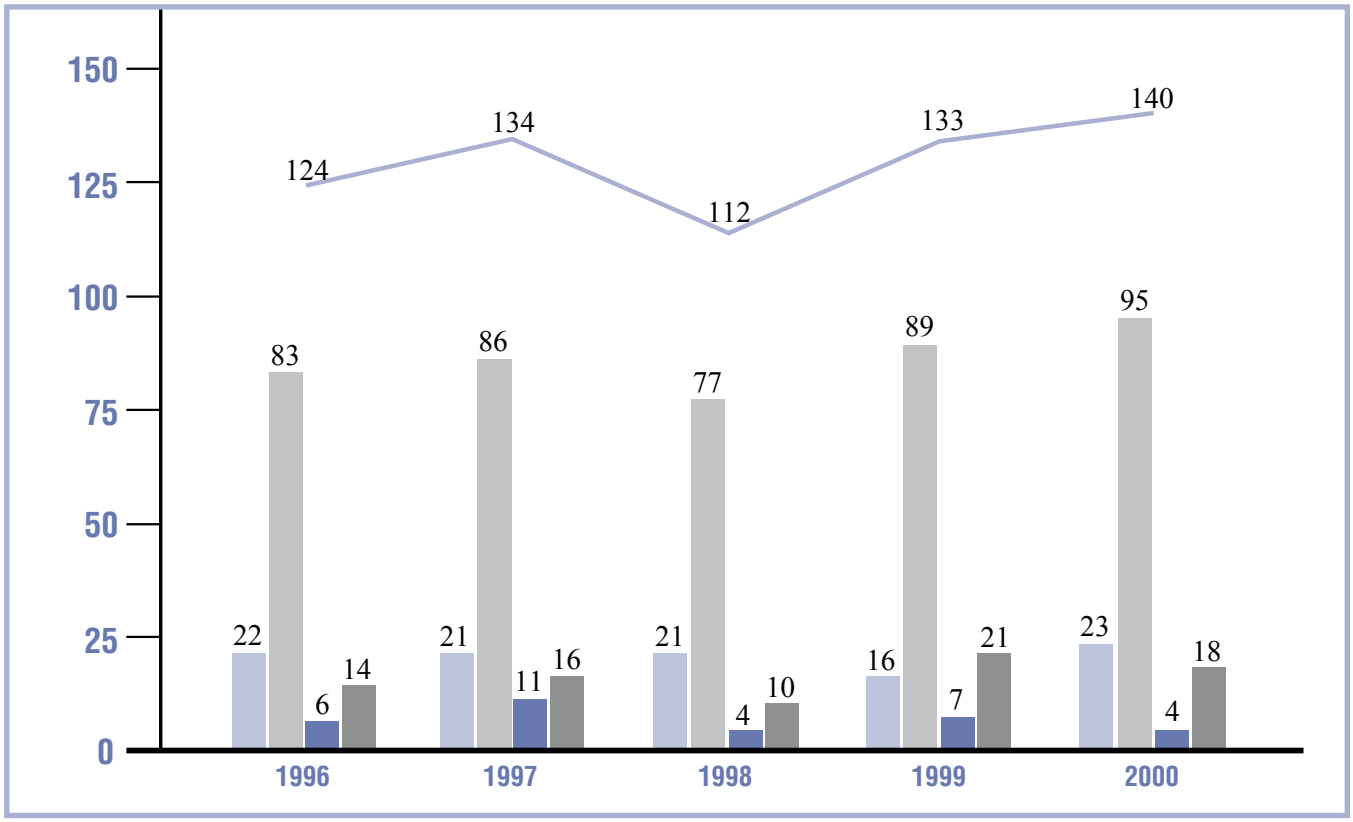
Figure 97. Age distribution of suffocation victims in Hawai'i, by type, 1996-2000.



Suicides:

Suicide was the leading cause of fatal injuries among state residents, accounting for one-quarter of the total number of victims. There were 643 suicides among state residents in the 1996-2000 period, with the annual total varying inconsistently between 112 and 140 victims (Figure 98). About two-thirds (67%, or 430) of the victims were residents of O'ahu. There were also 102 from Hawai'i, 78 from Maui County, and 32 from Kaua'i.

Figure 98. Annual number of suicides among Hawai'i residents, by county, 1996-2000.



Almost all (96%, or 620) of the victims were 19 years or older (Figure 99). About two-thirds (64%, or 409) were between 25 and 54 years of age. The figure also shows that male victims (496) outnumbered females (147) by more than a 3-to-1 ratio.

Figure 99. Age and gender distribution of suicide victims in Hawai'i, 1996-2000.

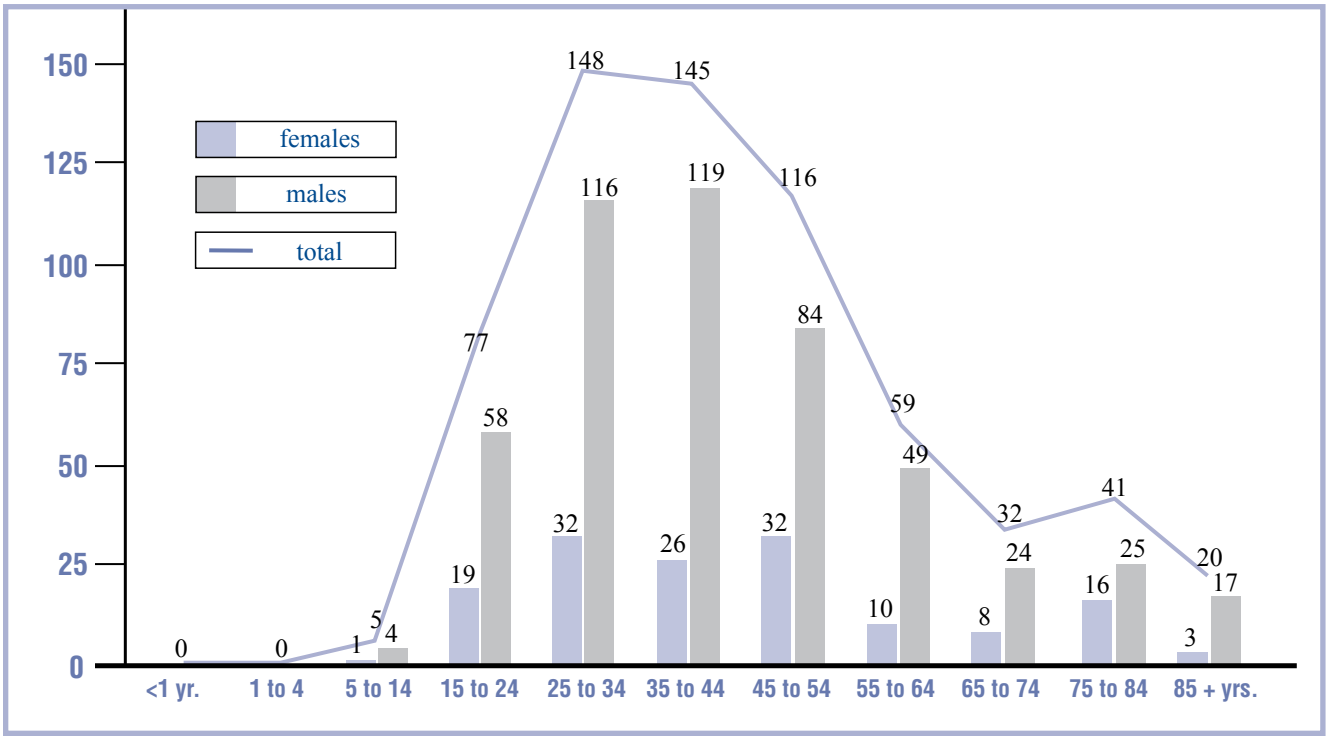
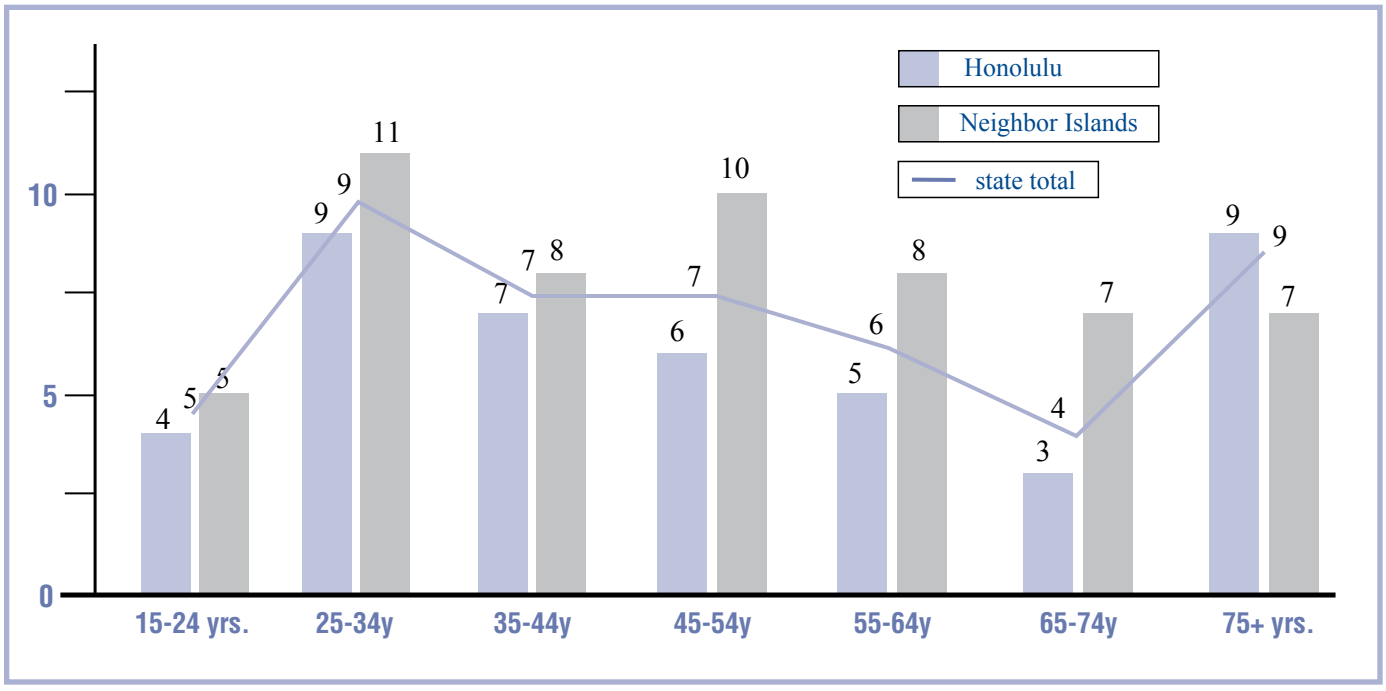


Figure 100 shows that the rate of suicide in the state (shown by the solid line) rose sharply in the 25 to 34 year age group, then declined steadily before another sharp increase among residents aged 75 years and older. The age-specific rates of suicide were higher among residents of Neighbor Islands compared to residents of O'ahu in all of the age groups, except for the oldest (ages 75 and older).

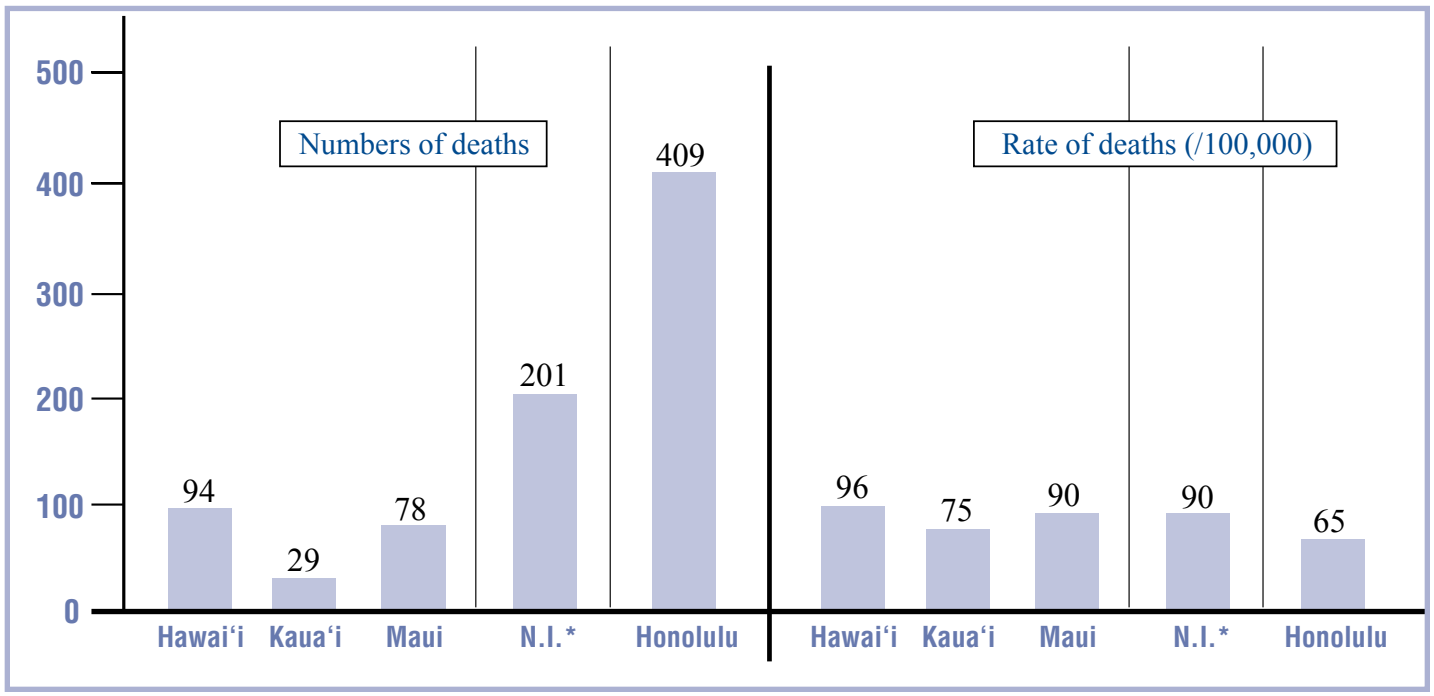
Figure 100. Five-year rates (/10,000) of suicide among residents of O'ahu and Neighbor Islands, by age group, 1996-2000.



That geographic difference is summarized over the complete age range in Figure 101. Although two-thirds of the victims were residents of O‘ahu, the overall rate there was 28% lower compared to that for residents of the Neighbor Islands. The rates on Hawai‘i and Maui Counties were especially elevated, compared to O‘ahu.

Figure 101. Number and rate of suicides in Hawai‘i, by county of residence, 1996-2000.

(Includes only residents aged 20 years and older.)

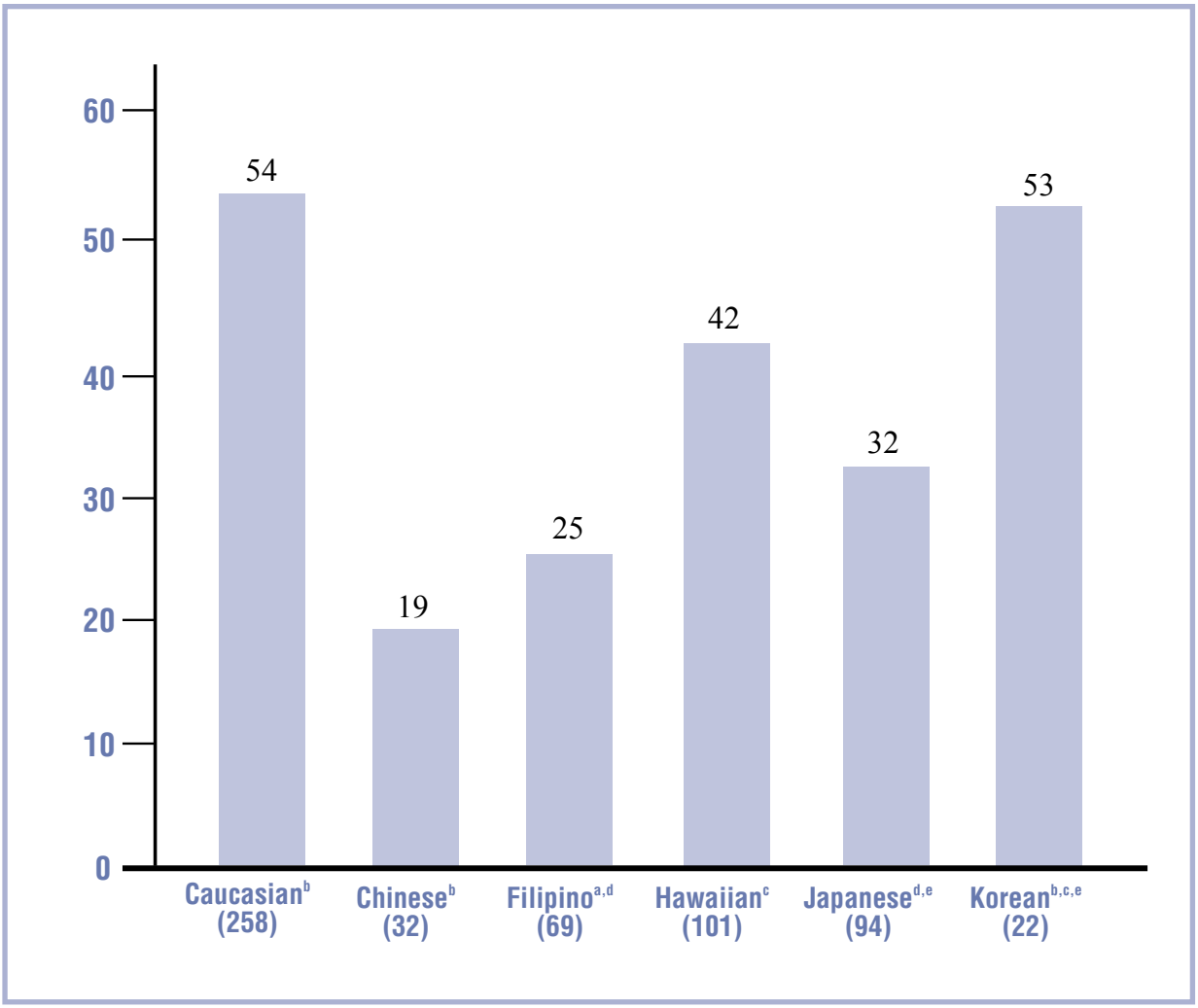


Although two-thirds of the suicide victims were residents of O‘ahu, the overall rate there was 28% lower compared to that for residents of the Neighbor Islands.

Of the 6 ethnicities studied, Caucasians and Koreans had the highest rates of suicide (Figure 102), although the latter rate was based on a low number of 22 suicides. The rate for Caucasians was significantly greater than that for all the other ethnicities except for Koreans. Rates were lowest for Chinese, Black, and Filipino residents. The lowest rates were computed for residents of Chinese and Filipino ancestry, with intermediate rates for Hawaiians and Japanese.

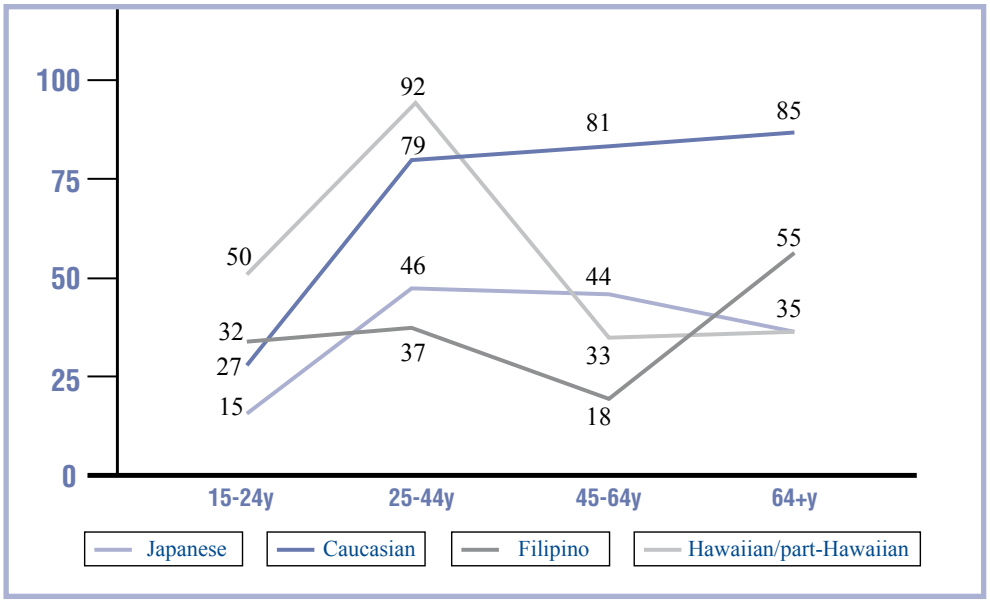
Figure 102: Unadjusted rates (per 100,000) of suicides, by ethnicity, 1996-2000.

(Number of deaths given in parentheses in bottom labels. Groups with the same superscripted letter have statistically comparable rate estimate.)



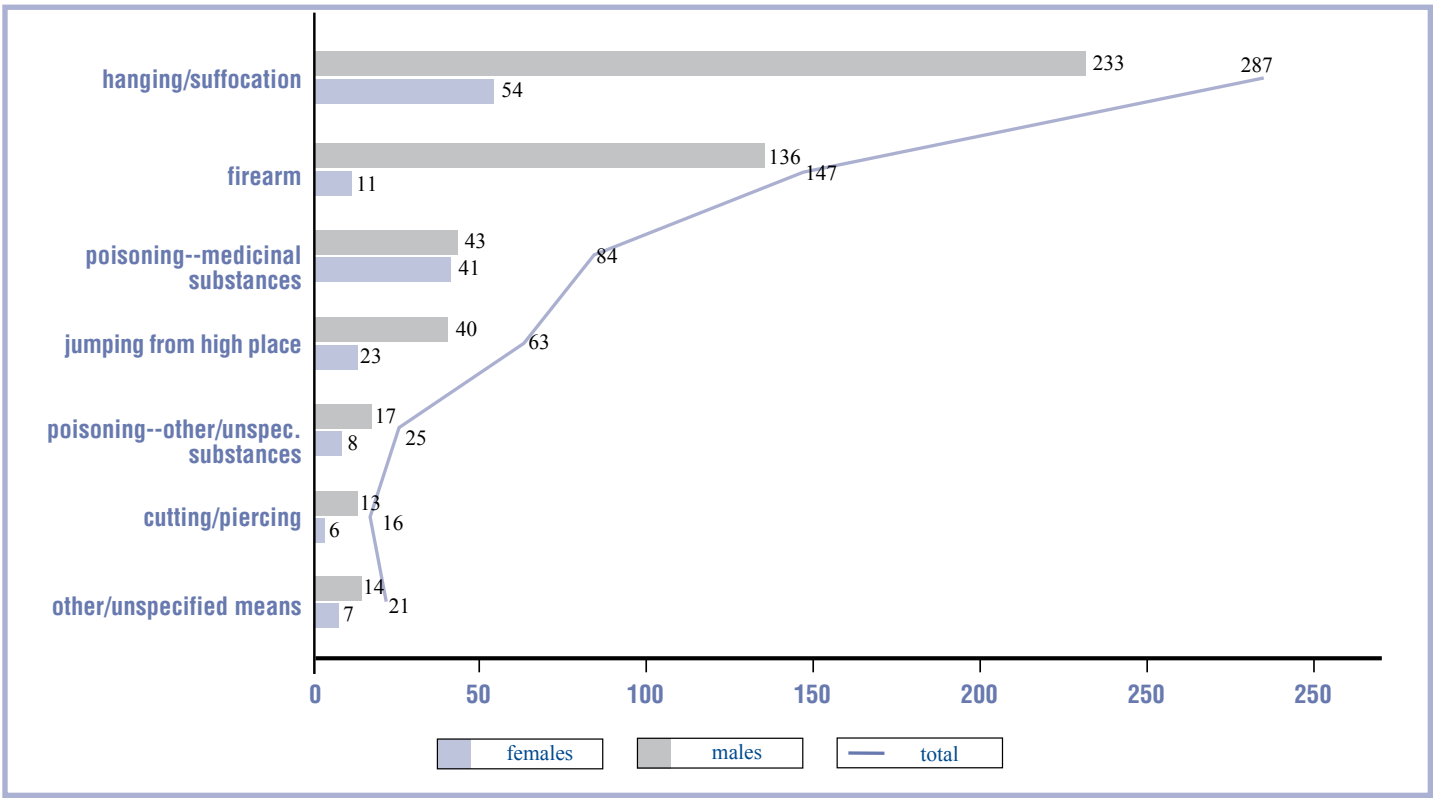
Suicide rates were computed for different age groups within the 4 ethnicities with at least 60 deaths (Figure 103). Hawaiians/part-Hawaiians had significantly higher rates for 15 to 24 year-old residents than did the other 3 ethnicities, as well as the highest rate among 25 to 44 year-olds. However, rates for Hawaiians/part-Hawaiians decreased to relatively low levels among residents aged 45 years and older. The suicide rate generally increased across the age range for Caucasian residents, who had the highest rates in the oldest age groups. In contrast, the rates were relatively flat across the age ranges for Japanese and Filipino residents.

Figure 103: Suicide rates (per 100,000) among residents of Hawai'i, by age group and ethnicity, 1996-2000.



The most common mechanism of suicide was by hanging or suffocation, which accounted for 45% of the deaths (Figure 104). Use of firearms was the second most common method, although it accounted for a much higher proportion of the suicides among males (27%), than among females (7%). Other major mechanisms included poisoning from medicinal substances (85 victims, or 13% of the total), and jumps from high places (63 victims, 10%). Male victims were more likely to die by firearm use (27% of male victims) and hangings/suffocations (47%), compared to female victims (7% and 37%, respectively). Females were more likely than males to use medicinal substances (28% vs. 9%) and jumping from high places (16% vs. 8%). There were no clear differences in mechanism of suicide and age or county of residence of victim, nor were there any clear trends over the 5-year period.

Figure 104. Suicides among male and female residents of Hawai'i, by mechanism, 1996-2000.

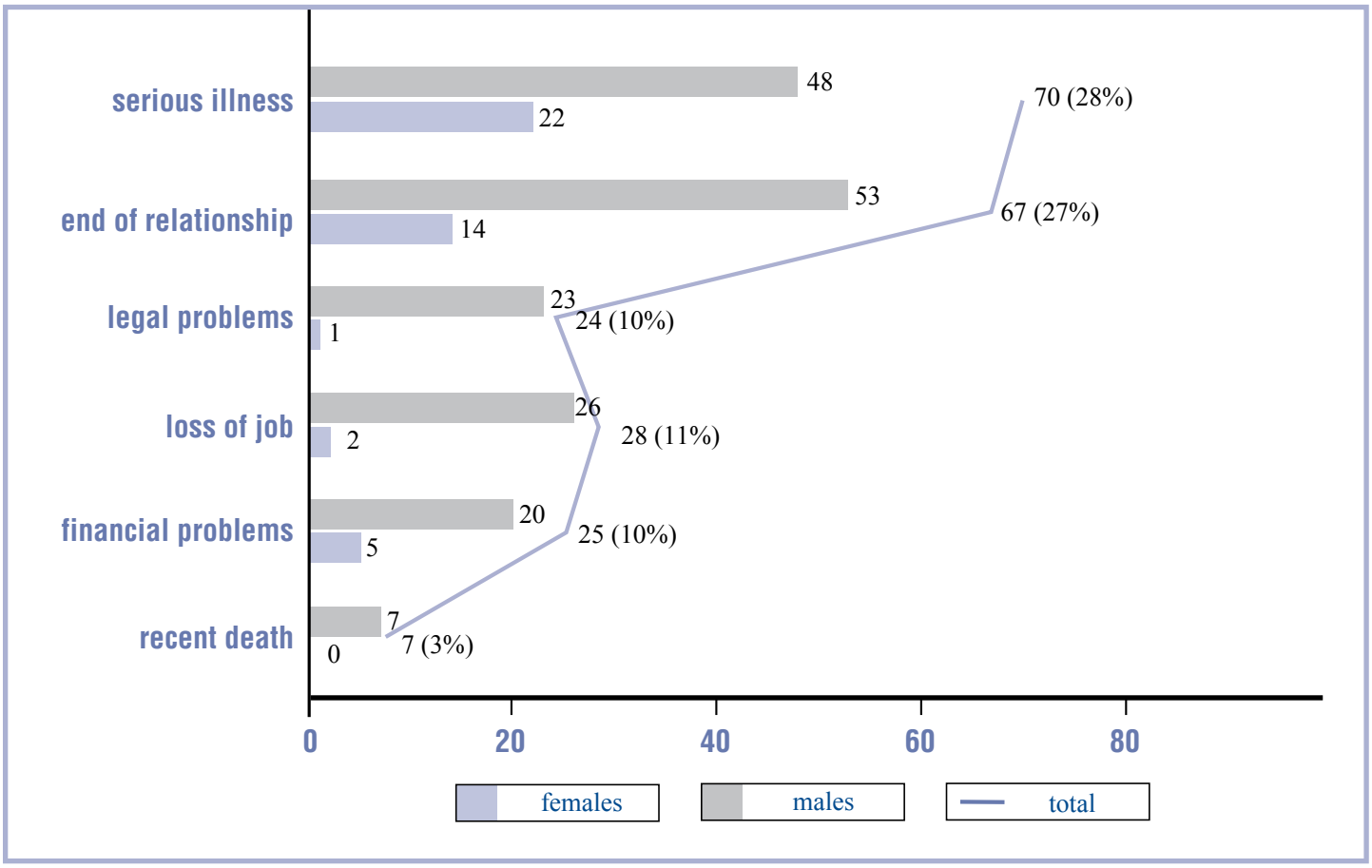


Records from the Medical Examiner (ME) of Honolulu County were linked to the suicides that occurred in the county during the 1997-1999 period. ME records were located for 250 of the 256 (98%) suicides in Honolulu County over the 3-year period.

At least one negative life event was documented in the ME file of nearly two-thirds (161, or 64%) of the 250 victims. Most of the victims (71%, or 114) had experienced a single negative event, 21% had two, and 8% had three. The most common negative events were serious illness (documented in 28% of the cases), and end of relationships (27%) (Figure 105). Legal problems, job loss, and financial problems were documented for approximately 10% of the victims.

There was no significant difference in the overall proportion of male victims with a documented negative event, compared to female victims (67% vs. 57%). Male victims, however, were more likely to have had legal problems (12% vs. 2% for females) or the loss of a job (14% vs. 3%) as negative events, and females were more likely to have had a serious illness (34% vs. 26% for males).

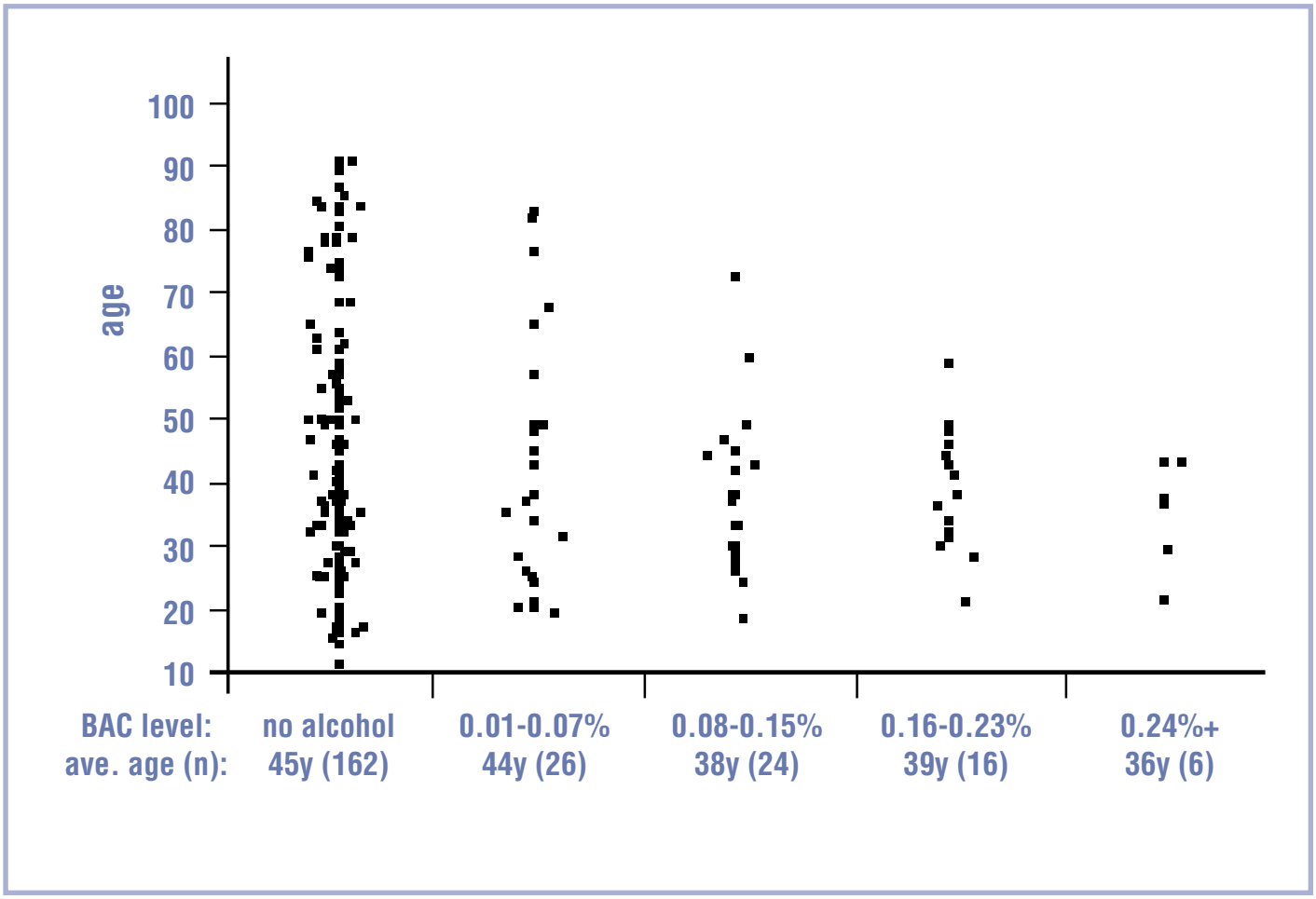
Figure 105. Negative life events documented in the Medical Examiner records of suicides in Honolulu County, by gender, 1997-1999.



Victims with a documented negative life event were significantly older than those without (average age 46 vs. 38 years). Relatively few (40%) of the younger victims (ages 15 to 29 years) had a documented negative life event, compared to victims 30 years and older (73% with negative life events). Older victims (ages 65 or more) most commonly had serious illnesses documented (65% (24 of 37 victims), compared to 0% to 3% for the other events listed in the figure). The most common event among the youngest victims (ages 19 and younger) was an end to a relationship (19% (3 of 16 victims), compared to 0% to 6% for the other events). Job loss (21% (17 of 82 victims) and financial problems (20% (16 of 82 victims) were most common among victims aged 40-64 years.

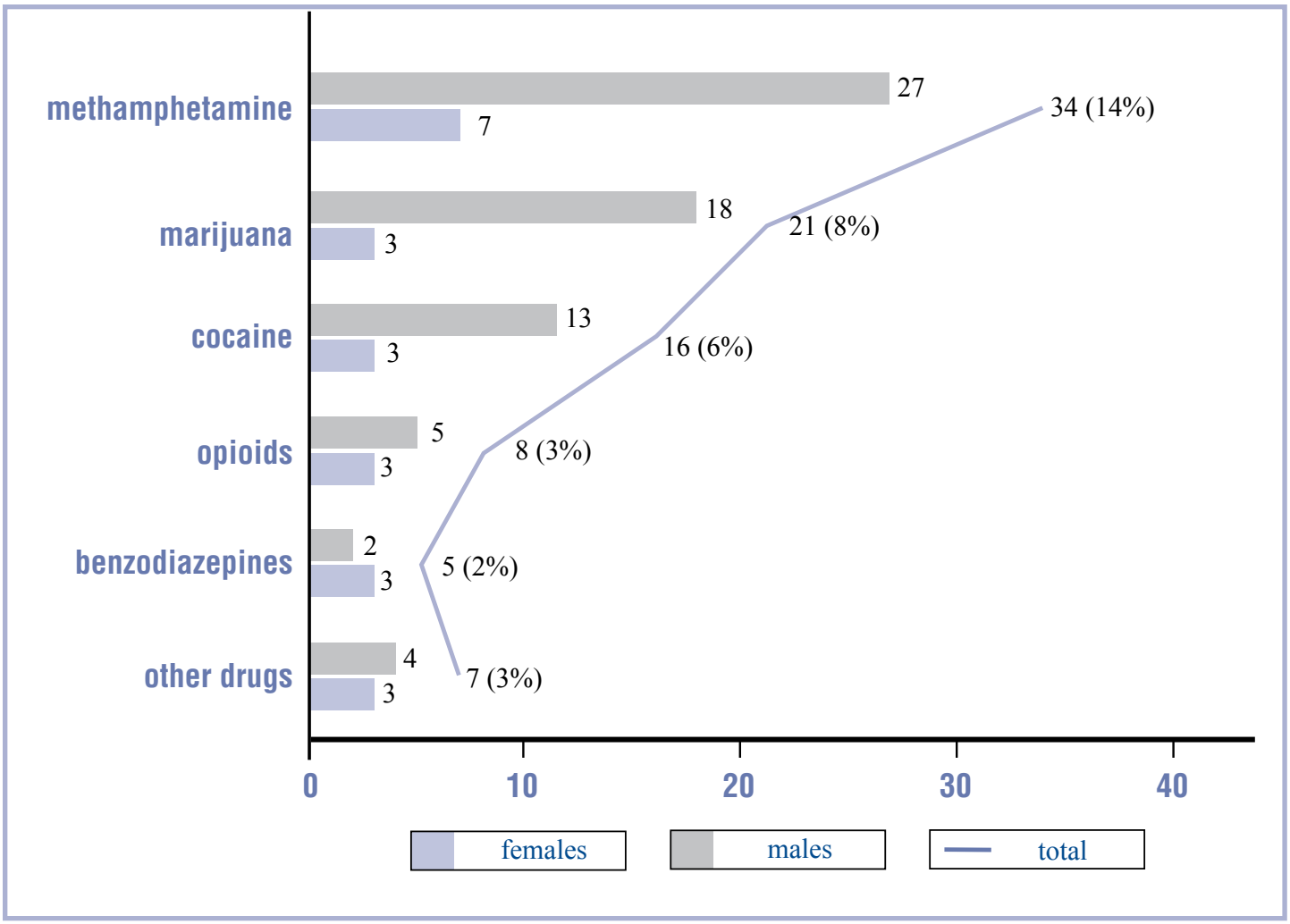
Alcohol test results were available for 94% (234) of the 250 victims linked to ME records. About one-third of those victims (31%, or 72) had measurable levels of alcohol in their blood at the time of autopsy, and one-fifth (46, or 20%) had BAC of 0.08% or greater, the level used to indicate inebriation among drivers in Hawai'i (Figure 106). (These proportions were similar if only victims aged 21 years and older are considered: 32% and 21%, respectively.) About 11% (22) of the victims had BAC levels of 0.16% or greater (i.e. twice the legal limit). Male victims were more likely to have had detectable levels of alcohol (33% vs. 24% for females), but not to a statistically significant degree. The average age of victims with BAC levels of 0.08% or greater was significantly younger than that of the non-drinkers (38 vs. 45 years). There were proportionally more 30 to 49 year-olds in the former group, and more senior-aged victims (ages 65 and older) among the non-drinkers.

Figure 106. Age distribution of suicide victims in Hawai'i, by blood alcohol concentrations (BAC), 1997-1999.



Toxicologic exams identified illicit drugs in the blood of about one-fourth (65, or 26%) of the victims. (In this report, the term "illicit" includes drugs such as opioids and benzodiazepines, which also have medicinal uses.) The most commonly identified drug was methamphetamine, present in 14% (34) of the victims, followed by marijuana and cocaine (Figure 107). Apart from methamphetamine, the other drugs were identified in fewer than 5% (3) of the female victims. Seventeen (7%) of the victims had more than one of the drug groups in their systems at the time of autopsy.

Figure 107. Presence of drugs in the blood of suicide victims in Honolulu County, by gender, 1997-1999.



As per alcohol use, male victims were more likely to have had detectable levels of drugs (28% vs. 20% for females), but this was not a statistically significant difference. The average age of victims who had used drugs was significantly younger than that of those who had not (34 vs. 46 years, respectively). Most of the drug users (71%, or 46 of 65) were between the ages of 20 and 39 years.

There was a significant association between alcohol and drug use, as 38% of the victims who tested positive for alcohol also tested positive for drugs, compared to only 21% of the non-drinkers. There was also a clear progression of drug use across the categories of non-drinkers (21% positive for drug use), those with a BAC level of 0.01 to 0.08% (27%), and those with a BAC of 0.08% or greater (43%).

Almost two-thirds (62%, or 154) of the victims had a history of mental illness documented in the ME record. (Mental illness does not include substance dependence, in this case.) Almost all of those victims (148, or 96%) had a diagnosis of mood disorders. Fifteen victims had psychosis, and seven others had anxiety disorder. There was no significant difference in the gender distribution between victims with and without a history of mental illness. However, the average age of the group with documented mental illness was greater than that of victims without (45 vs. 40 years). Mental illness was particularly common among the 40 to 64 year-olds (74%) and victims aged 65 years and older (68%).

About one-fifth (22%, or 55) of the victims had a previous suicide attempt documented in the ME record. There were no differences in the gender or age distributions of the victims who did and did not have a history of attempting suicides. The older victims (age 65 and older) were the least likely to have had a previous suicide attempt (11%, or 4 of 37 victims).

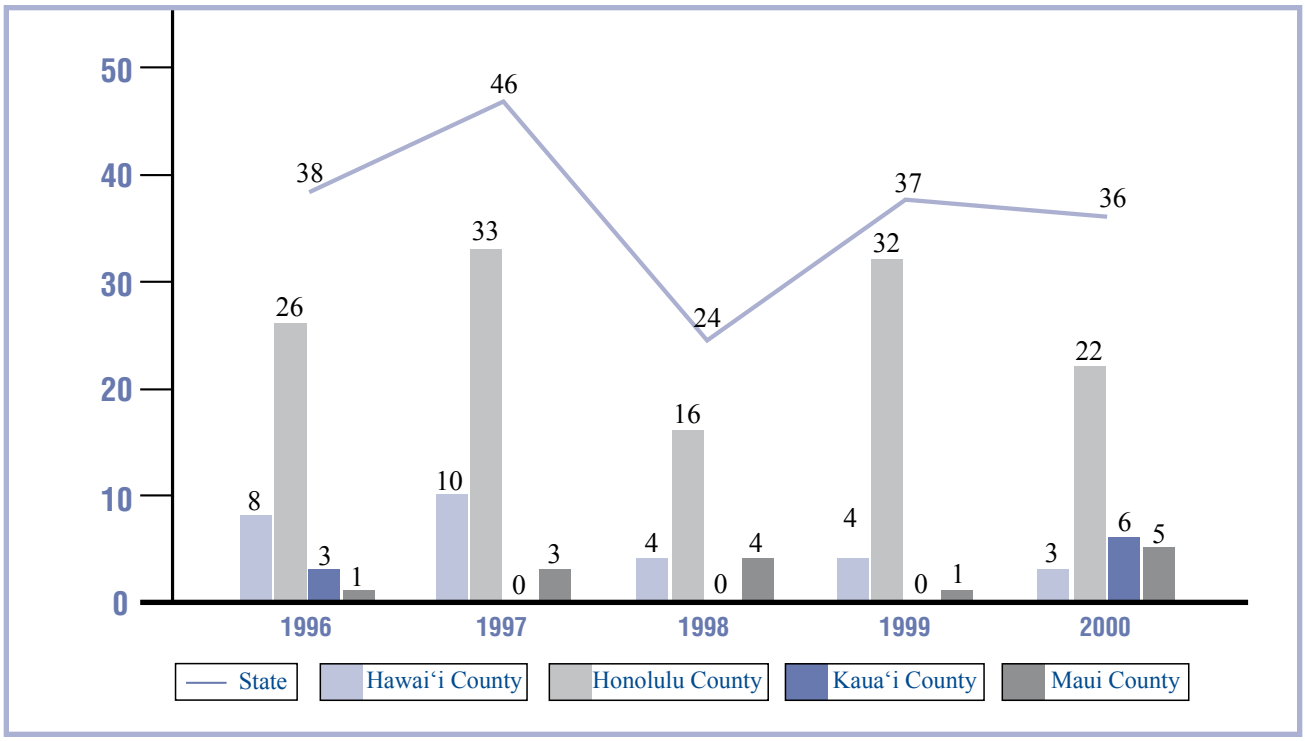
The autopsy records were linked with criminal history information obtained from the Hawai‘i Criminal Justice Data Center. Almost half (47%, or 117) of the victims had an arrest record, and 10% (25 victims) had been convicted of at least one crime.

Homicides:

Homicide was the 3rd leading cause of fatal injuries among state residents, after suicide and deaths among motor vehicle occupants. There were 181 victims of homicide over the 1996-2000 period. There was no consistent trend in the annual number of victims (Figure 108), although the 1998 total of 24 victims was by far the lowest. The 181 victims died in 171 separate incidents, as 14 were killed in multiple murders. Three victims were shot by a single assailant on O‘ahu in August of 1996, and seven were shot during a well-known incident in Honolulu in November of 1999. There were also 2 double murders, both on the island of Hawai‘i.

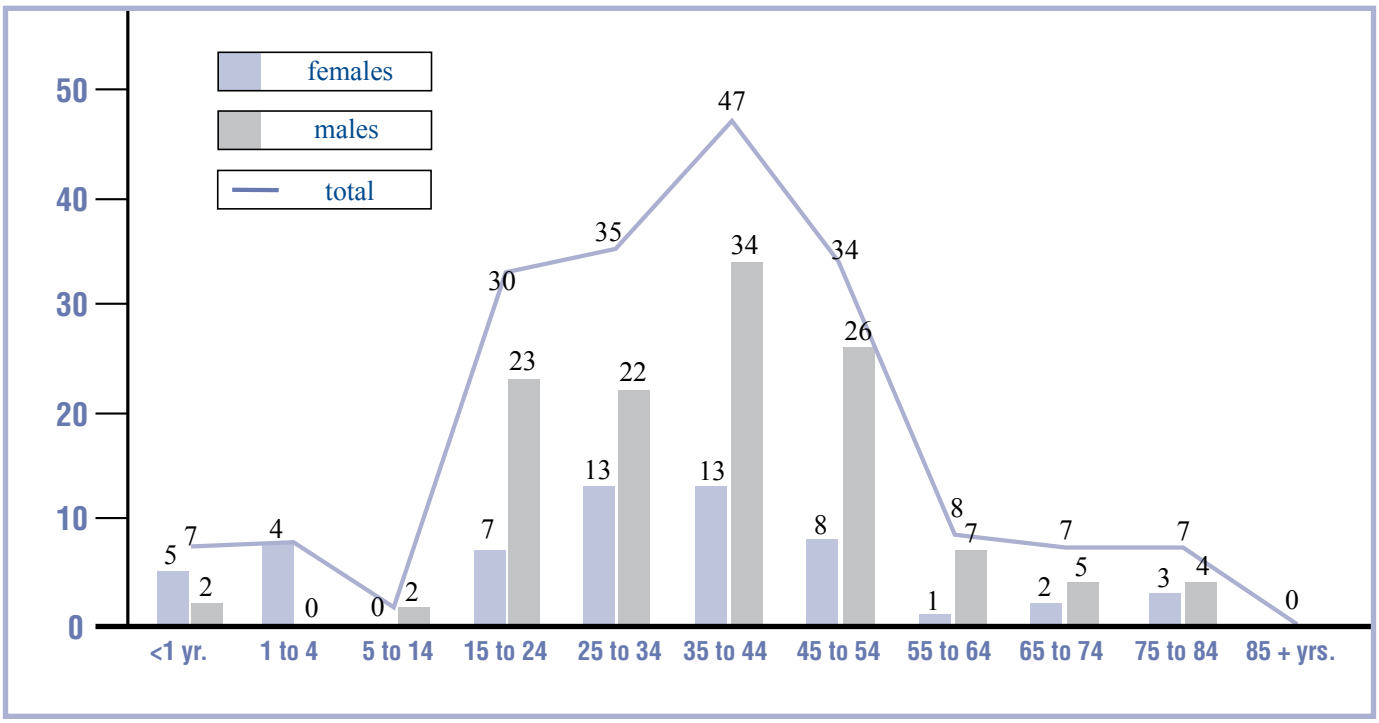
The figure shows that the majority of victims (71%, or 129%) were killed on the island of O‘ahu. Half (29, or 16% of the state total) of the remaining victims were killed on Hawai‘i, 14 in Maui County (1 on Moloka‘i, the rest on the island of Maui), and 9 on Kaua‘i.

Figure 108. Annual number of homicides among Hawai‘i residents, by county, 1996-2000.



The ages of the victims ranged from infancy to 83 years, but most (80%, or 146) were between the ages of 15 and 54 years (Figure 109). There was also a notably high number of very young victims; 7 were infants and 3 were 1-year-olds. There were only 3 victims between 2 and 14 years of age. Male victims (125, or 69%) outnumbered females (56, or 31%) by a 2-to-1 ratio.

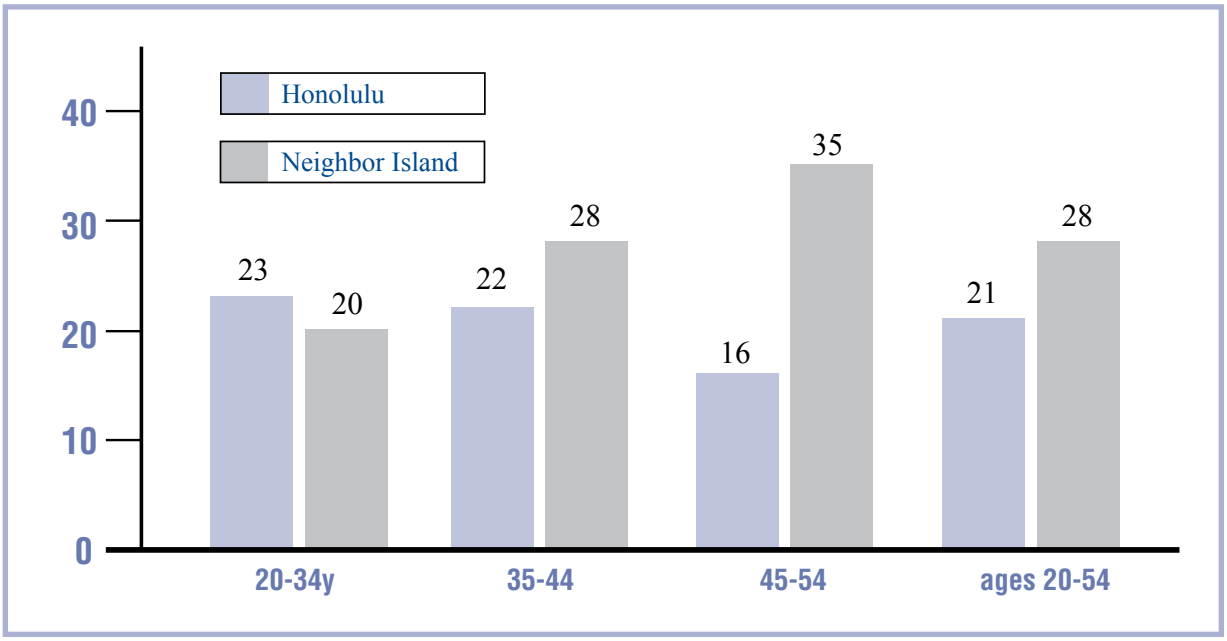
Figure 109. Age and gender distribution of homicide victims in Hawai'i, 1996-2000



...there was also a notably high number of very young homicide victims; 7 were infants and 3 were 1-year olds...

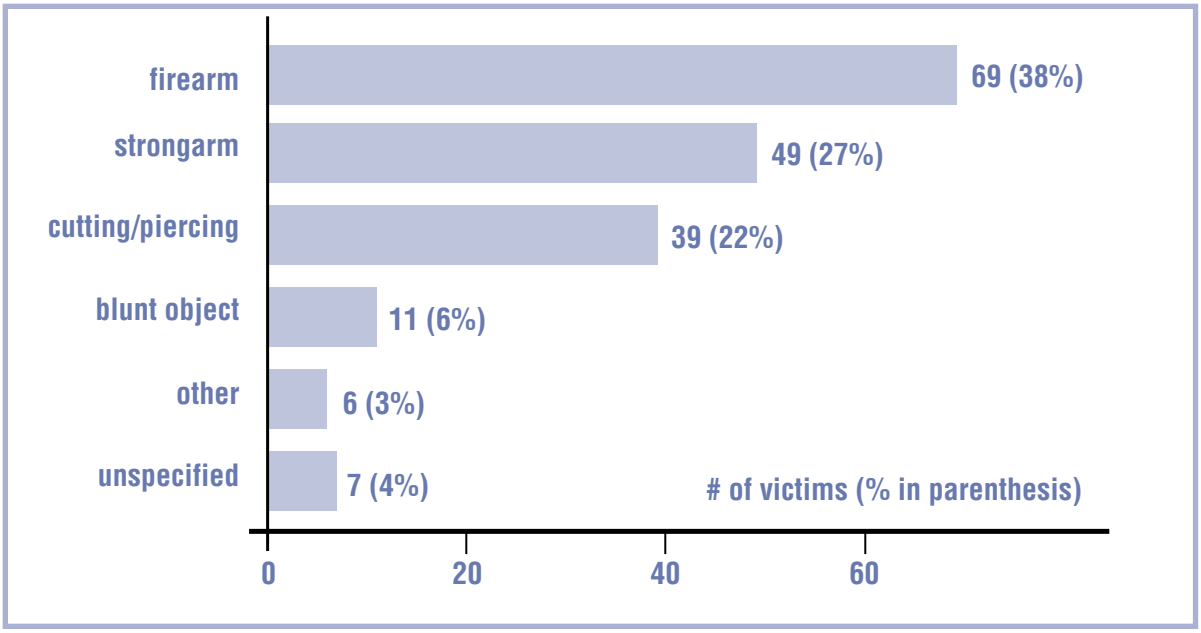
Although most of the victims were killed on O'ahu, homicide rates were higher among residents of the Neighbor Islands in the 35 to 54 year age groups (Figure 110). (Rates were slightly higher for O'ahu residents in the 20 to 34 year age range, although comparisons in this range are based on relatively few cases.) Overall, homicide rates among 20 to 54 year-olds were 29% higher among Neighbor Island residents, compared to residents of O'ahu.

Figure 110. Five-year homicide rates among residents of O'ahu, and Neighbor Islands, by age group, 1996-2000.



Firearms were the most common means of homicide, as 38% of the victims were shot (Figure 111). Most of the remaining victims were killed without the use of a weapon, by physical force ("strongarm"), or by cutting or piercing instruments (almost invariably knives). Most of the firearm-related homicides involved a handgun (76% of the 59 homicides for which this information was available). Rifles and shotguns were used in the remaining homicides (12% each). A slightly greater proportion of the homicides among Neighbor Island residents were due to firearms, compared to those among O'ahu residents (45% vs. 35%). Proportionally more O'ahu residents were killed by physical force, compared to Neighbor Island victims (22% vs. 16%).

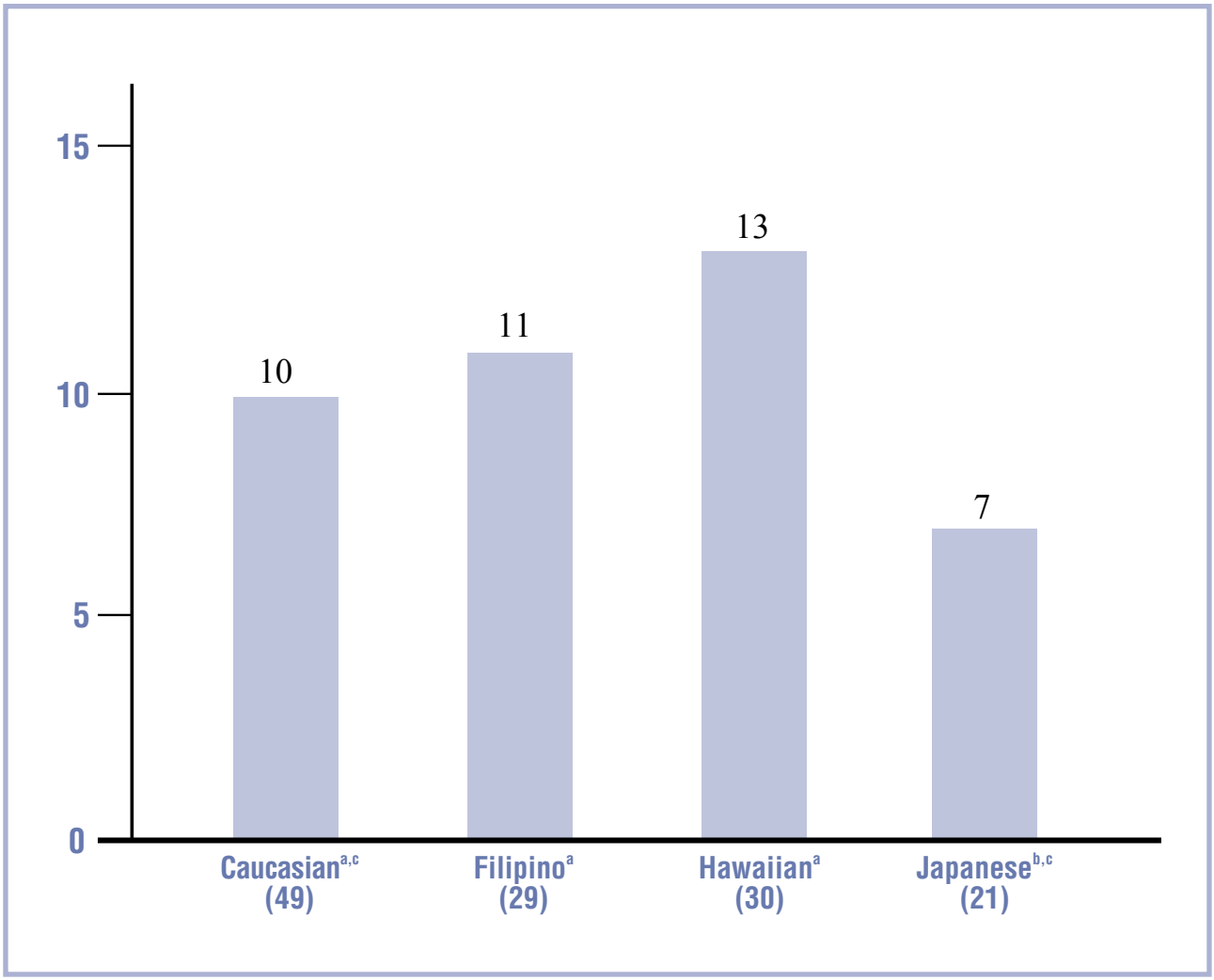
Figure 111. Homicides among residents of Hawai'i, by mechanism, 1996-2000.



The highest homicide rates were computed for victims of Hawaiian ancestry, although rates for Hawaiian, Caucasian and Filipino residents were all statistically comparable (Figure 112). Japanese residents had the lowest rates, significantly lower than those for Filipino and Hawaiian residents.

Figure 112: Unadjusted rates (per 100,000) of homicides, by ethnicity, 1996-2000.

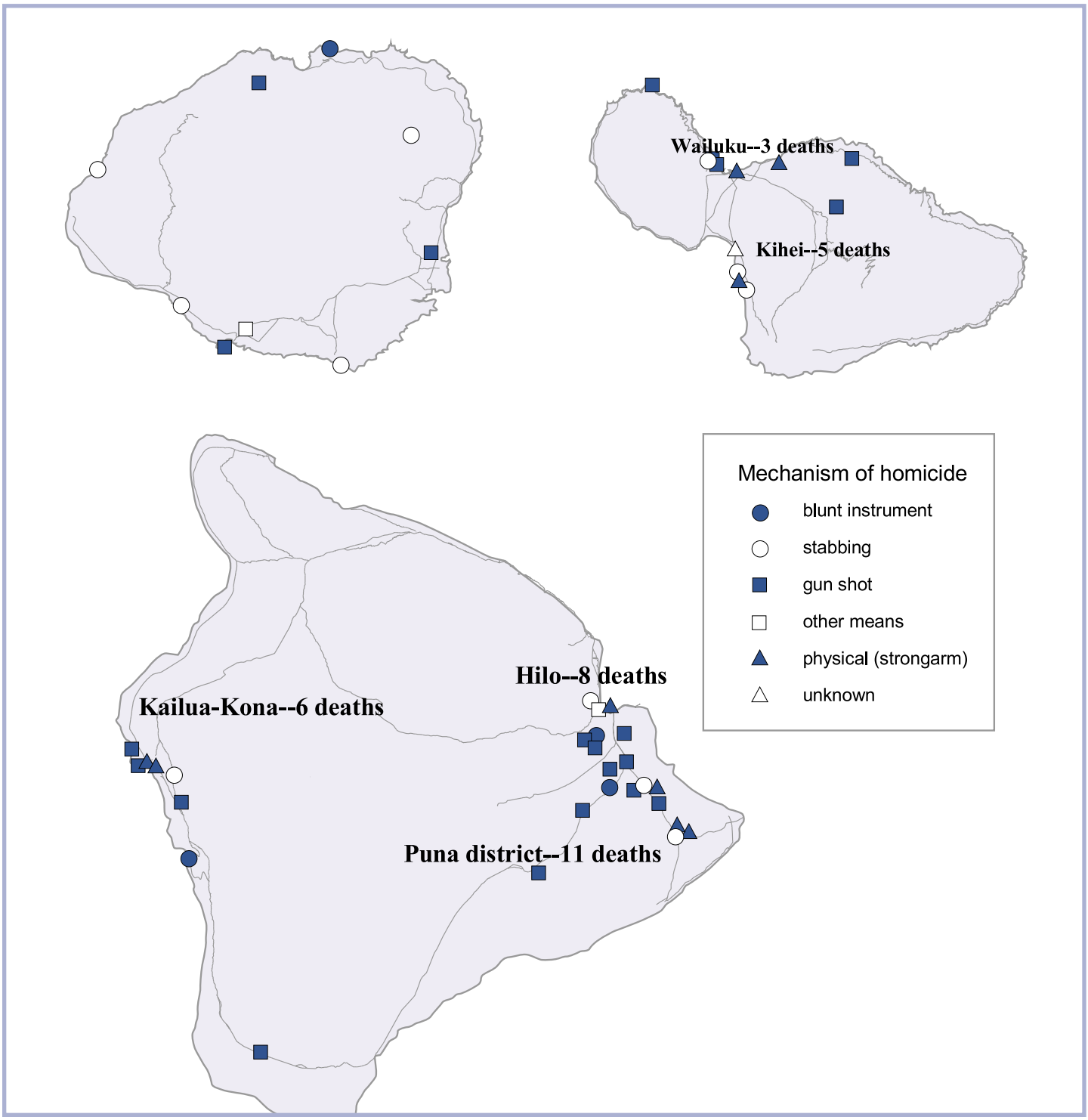
(Number of deaths given in parentheses in bottom labels. Groups with the same superscripted letter have statistically comparable rate estimate.)



Although most of the victims were killed on O'ahu, homicide rates were higher among residents of the Neighbor Islands in the 35 to 54 year age groups..

Below is a series of maps showing the geographic location of the 181 homicides over the 5-year period. (The unit of analysis was the incident, so as not to give undue weight to incidents with multiple victims.) Figure 113 shows that there was no particularly common area in which the 9 victims on Kauaʻi were killed. More than half of the 14 homicides on the island of Maui occurred in the Kīhei (5 victims) or Wailuku (3) areas. The highest concentration of homicides on the island of Hawaiʻi were in the Puna district, including 7 in Kea'au and surrounding areas, and 3 near Pāhoa. Most of the remaining deaths occurred in the Hilo or Kailua-Kona areas. Given the relatively small population of the Puna district, the crude 5-year homicide rate there (35 homicides/100,000 residents) was found to be almost double the rates for South Hilo (17/100,000) and North Kona (19/100,000) districts.

Figure 113. Homicide incidents among Hawaiʻi residents, by Neighbor Island location and mechanism, 1996-2000.



There were homicides in nearly all parts of the island of O'ahu, but Figure 114 shows particularly high concentrations in the western and central parts of the island, in addition to the metropolitan Honolulu area. Wai'anae and Kalihi-Pālama (13 incidents each), and Waikīkī (12) had the highest number of incidents. High totals were also recorded in the Waipahu (9), Downtown (7) and Wahiawā (7) areas. In contrast, there were 6 neighborhoods with no incidents, and 9 others with only a single incident over the 5 years.

Figure 114. Homicide incidents among O'ahu residents, by geographic location and mechanism, 1996-2000.

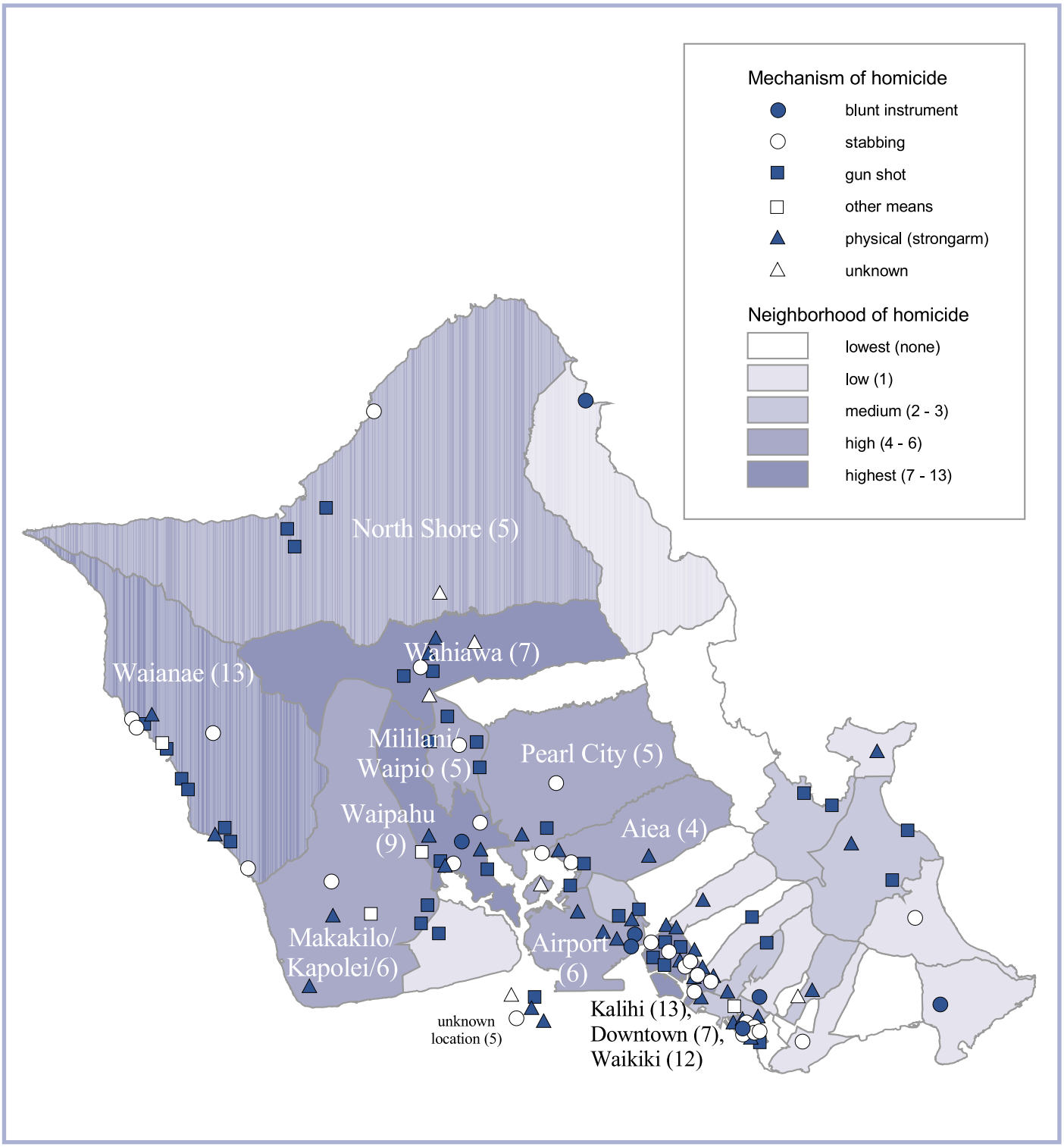
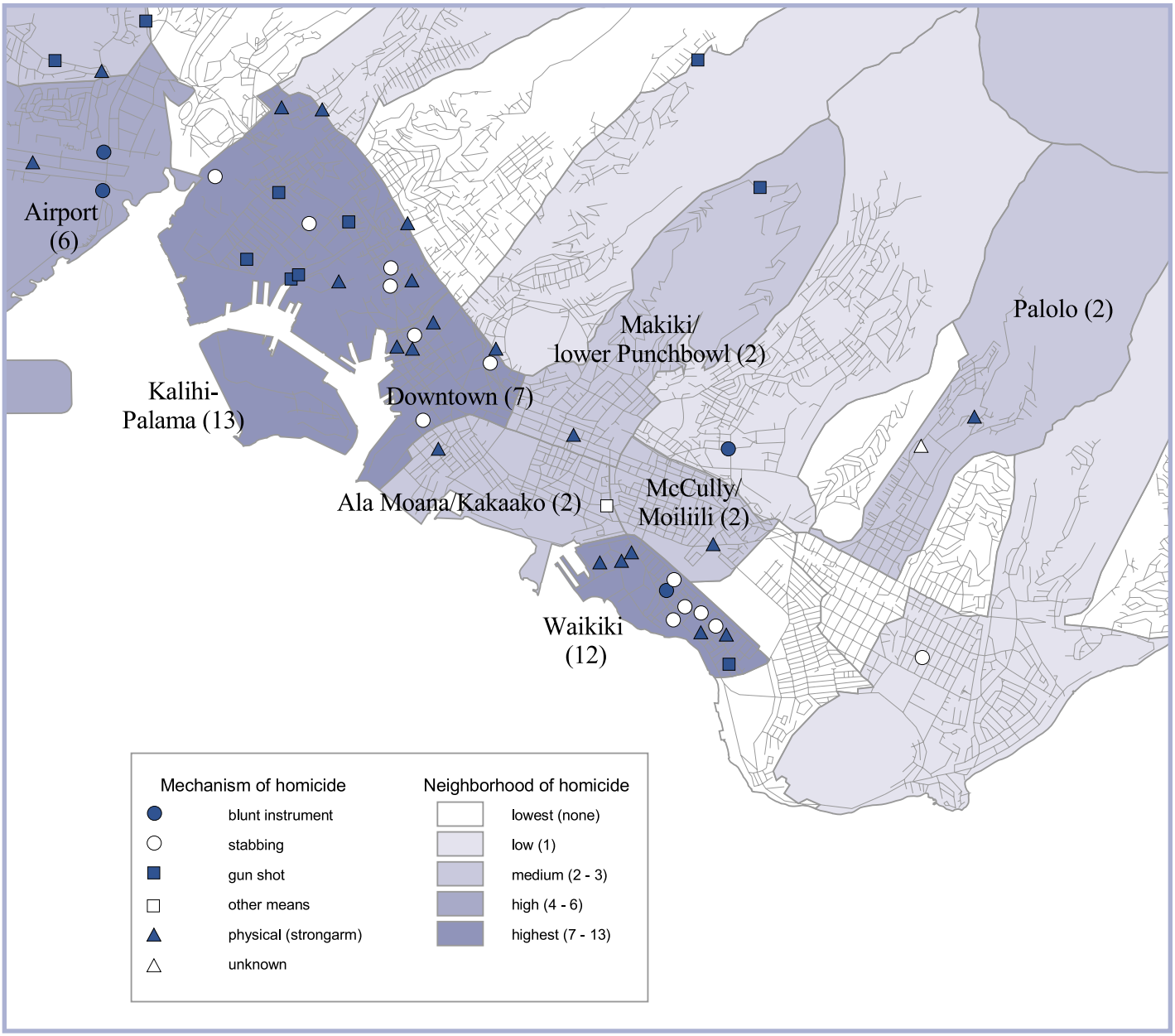


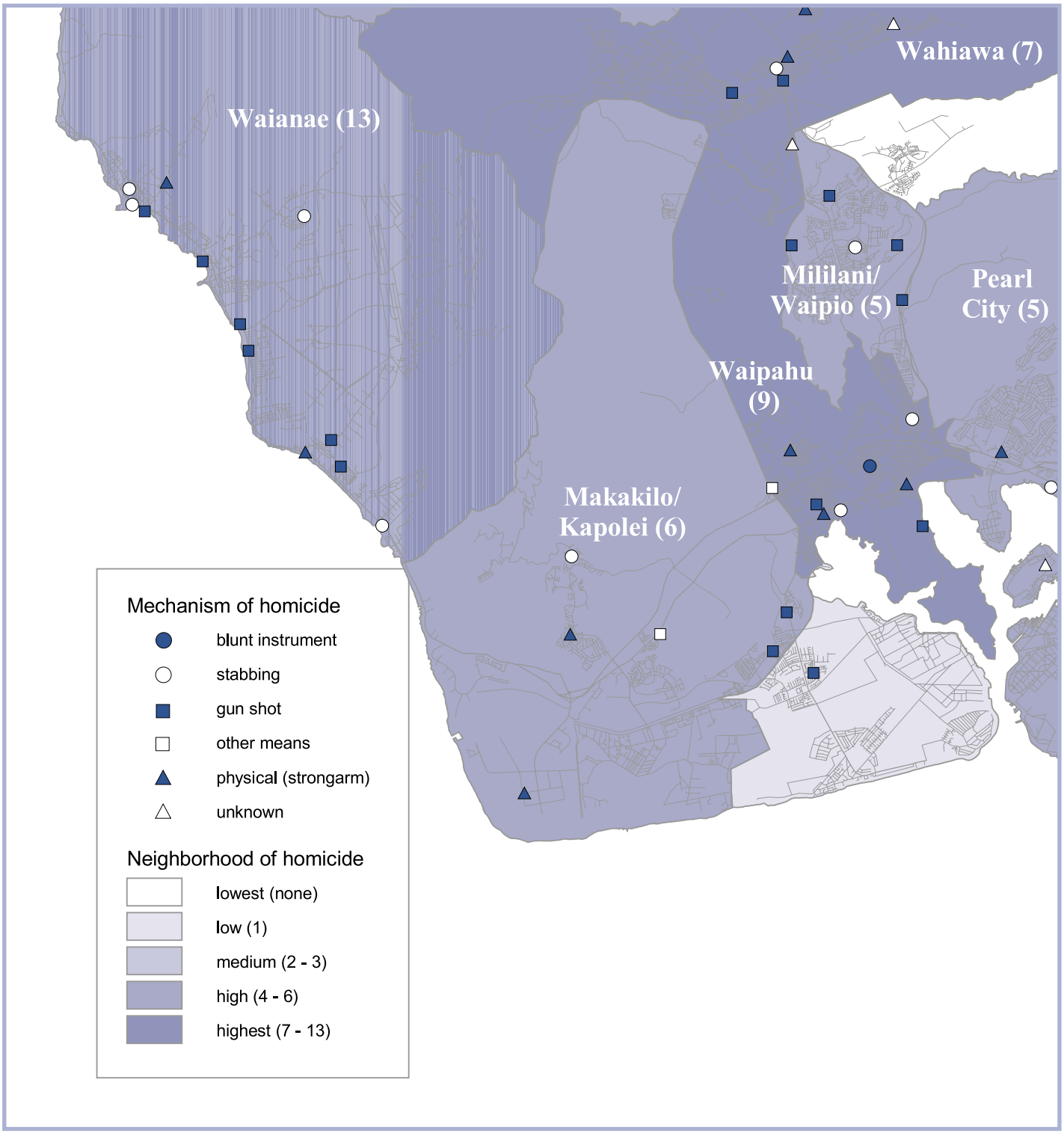
Figure 115 shows the locations of the homicides in the Honolulu area in more detail. There was no apparent clustering of incidents within each of the 3 high-risk neighborhoods of Kalihi-Pālama, Downtown, and Waikīkī. Firearms were more commonly used in the Kalihi-Pālama homicides, with proportionally more deaths from stabbings and beatings in the other 2 neighborhoods. None of the 9 other neighborhoods in metropolitan Honolulu had more than 2 homicides.

Figure 115. Homicide incidents in Honolulu, by geographic location and mechanism, 1996-2000.



All but one of the neighborhoods in western and central O‘ahu had a high number (5 or more) of homicide incidents (Figure 116). The 13 homicides in Wai‘anae occurred mostly along the coastal area, although over a wide range. There was some clustering of homicides in the more urbanized parts of Wahiawā, and along the Farrington Highway section of Waipahu. Incidents were more spread out in the Makakilo/Kapolei and Mililani/Waipi‘o neighborhoods. In general, proportionally more of the homicides in western and central O‘ahu were committed with firearms, compared to other parts of O‘ahu (with the possible exception of Kalihi-Pālama).

Figure 116. Homicide incidents in western and central O‘ahu, by geographic location and mechanism, 1996-2000.



Most of the 181 homicides (88%, or 159) were linked to Uniform Crime Reports (UCR) to provide additional data on the incident. Most of the following statistics therefore refer only to those 159 deaths that were linked to the UCR data . The proportion of linked records was highest for homicides in Maui and Kaua‘i Counties (100%), and lowest for Honolulu and Hawai‘i Counties (87% and 83%, respectively). Linked and non-linked homicides were otherwise comparable in terms of year, and age and gender of the victim.

According to UCR data, two-thirds (67%, or 106) of the 159 victims knew their assailants; only 18% were killed by strangers. (The victim-perpetrator relationship was not known in 15% of the homicides linked to UCR.) Most commonly, victims were killed by someone known to them outside of their families (68, or 43% of the 159 victims) (Figure 117). Three-fourths (43) of these 68 victims were killed by someone described as an "acquaintance". Nine victims were killed by co-workers (7 in a single incident), and 8 others by neighbors (3 in a single incident). Twenty-four of the victims were intimate partners of the assailant, including 13 spouses (10 wives, 3 husbands), 2 ex-spouses, 7 girlfriends, and 2 boyfriends. Other victims killed by family members included 6 children killed by their parents, and 4 victims who were siblings of the assailants.

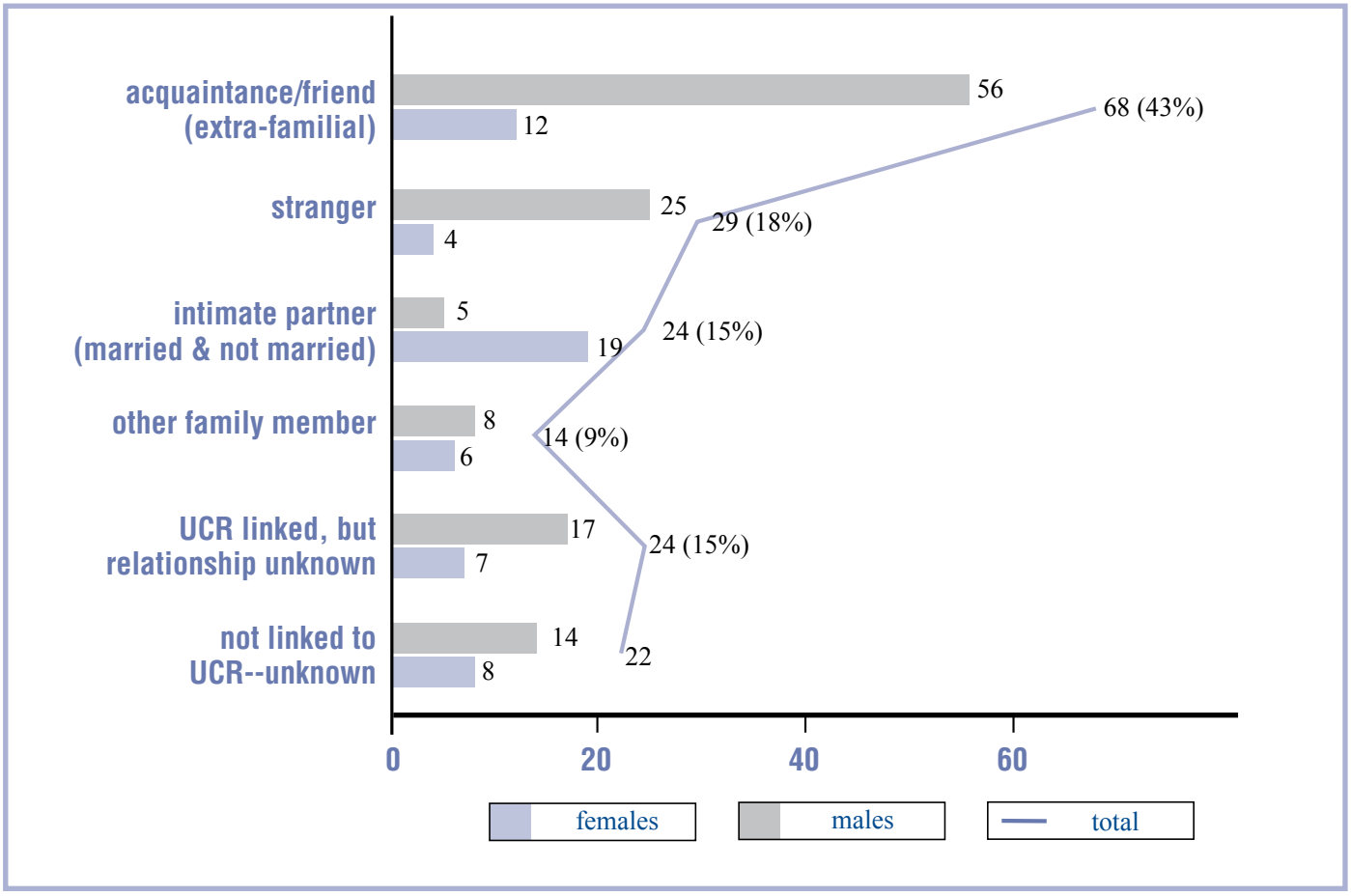
Figure 117 also shows that female victims were more likely to be killed by their intimate partners (40%), or other family members (13%) than were male victims (5% and 7%, respectively). Male victims were more likely to be killed by extra-familial acquaintances (50%) or strangers (23%).

Most (57%, or 39) of the 68 victims killed by acquaintances died as a result of an "argument", with no further details available. Four of the deaths were drug-related, 4 involved a "lovers’ triangle", and there were 2 deaths each due to robberies, arguments over property and money, revenge, and child abuse cases involving extra-familial assailants. Another 7 of these victims were shot by a co-worker for unknown reasons.

"Arguments" were also the cause of most (61%, or 23) of the 38 homicides that occurred between intimate partners or other family members. Six of the victims were children killed by a parent; the father in 5 of the cases. Of the remaining 9 homicides, 2 were due to arguments over money, 2 due to revenge, and 3 resulted from the break-up of the intimate relationship between the victim and assailant.

About a third (31%, or 9) of the 29 victims killed by strangers died during robberies. Only 2 of those deaths were due to firearms. Another third (10 victims) were killed during non-specified arguments, and the remaining third were due to other or unknown circumstances (3). None of the very young (up to 9 years) or older (ages 65 and greater) victims were killed by strangers. Most of the child victims (6 of 8) were killed by their parents, and most of the 13 senior victims were killed by acquaintances (6) or family members (3). (The victim-assailant relationship was not known for the remaining 4 victims.)

Figure 117. Victim-to-assailant relationship for homicides among Hawai'i residents, by gender, 1996-2000.

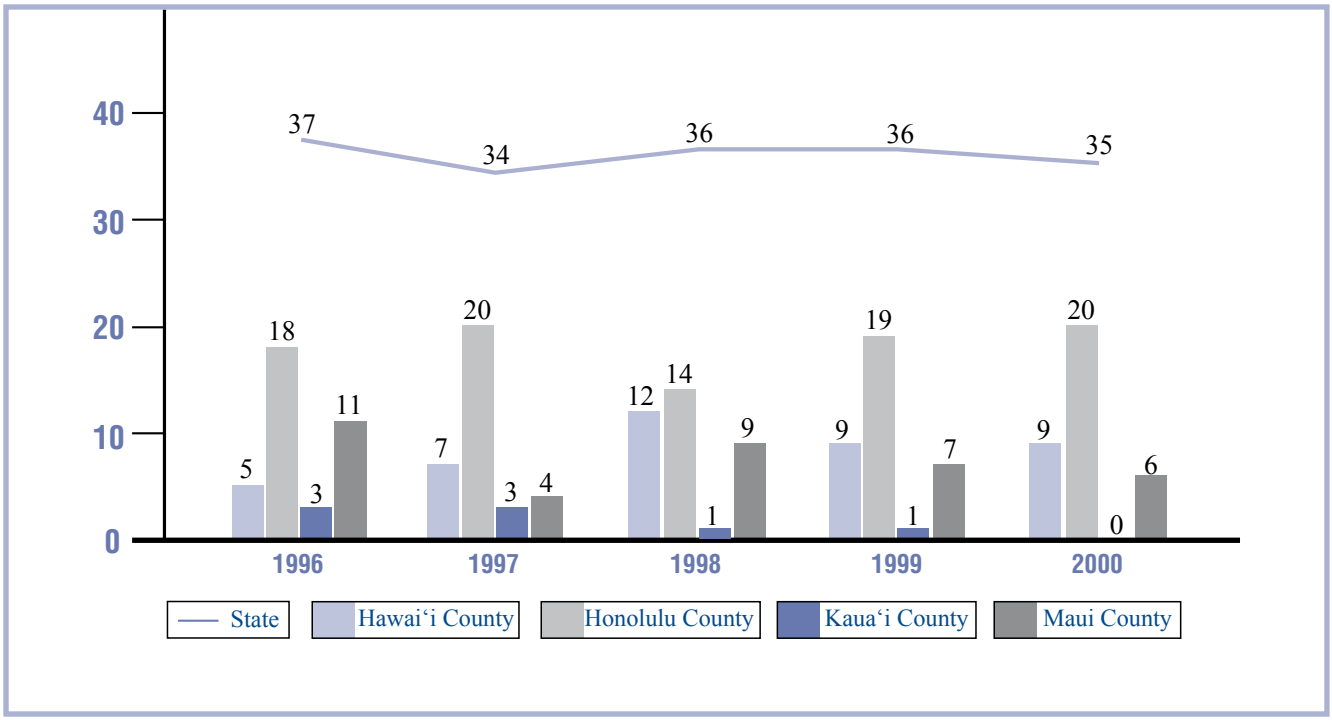


Female victims were more likely to be killed by their intimate partners (40%), or other family members (13%) than were male victims (5% and 7%, respectively). Male victims were more likely to be killed by extra-familial acquaintances (50%) or strangers (23%).

Injuries of undetermined intent:

This is a vague but important category to explore, since there were 178 fatal injuries over the 5-year period for which the intent could not be defined. Figure 118 shows that the annual number of such deaths was very consistent over time statewide and at the county level. This is important to note since it implies little possibility that coding bias influenced the trends for the more specific injury categories. About half (51%, or 91) of these victims resided on O‘ahu, 24% on Hawai‘i, 21% on Maui, and 4% on Kaua‘i. The undetermined intent designation is therefore more likely to be assigned to injury-related deaths of residents of Hawai‘i and Maui counties, than of O‘ahu residents.

Figure 118. Annual number of fatal injuries of undetermined intent among Hawai‘i residents, by county, 1996-2000.



The age distribution of these victims was more similar to that for suicide victims than to the age distribution of victims who died of unintentional injuries (Figure 119). The average age was 43 years, and only 10 (6%) of the victims were under 20 years of age. Almost two-thirds (63%, or 112) were between 35 and 54 years of age. There were also 8 infants among the victims. As for most kinds of intents, male victims (128) outnumbered females (50) by approximately 3-to-1.

Figure 119. Age and gender distribution of victims of fatal injuries of undetermined intent in Hawai'i, 1996-2000.

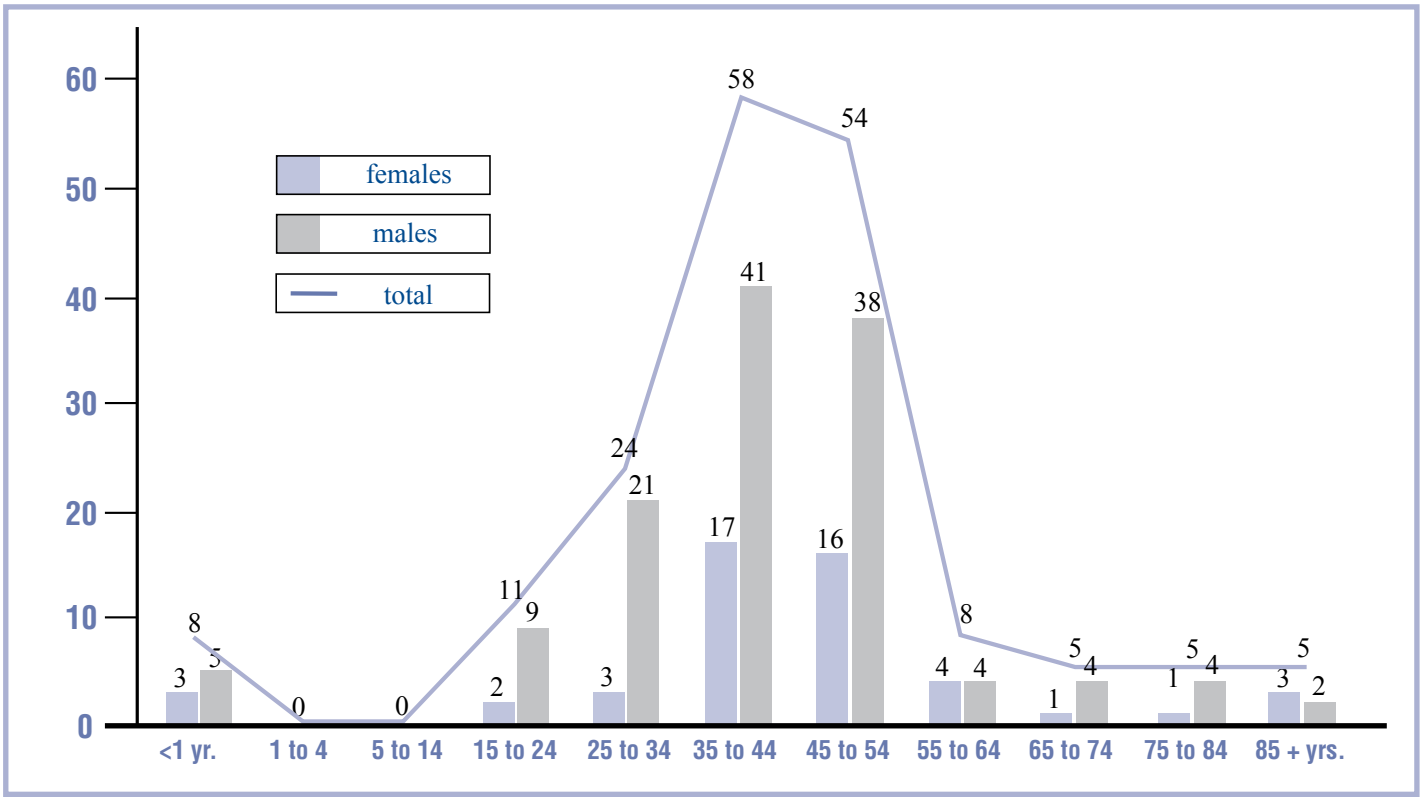
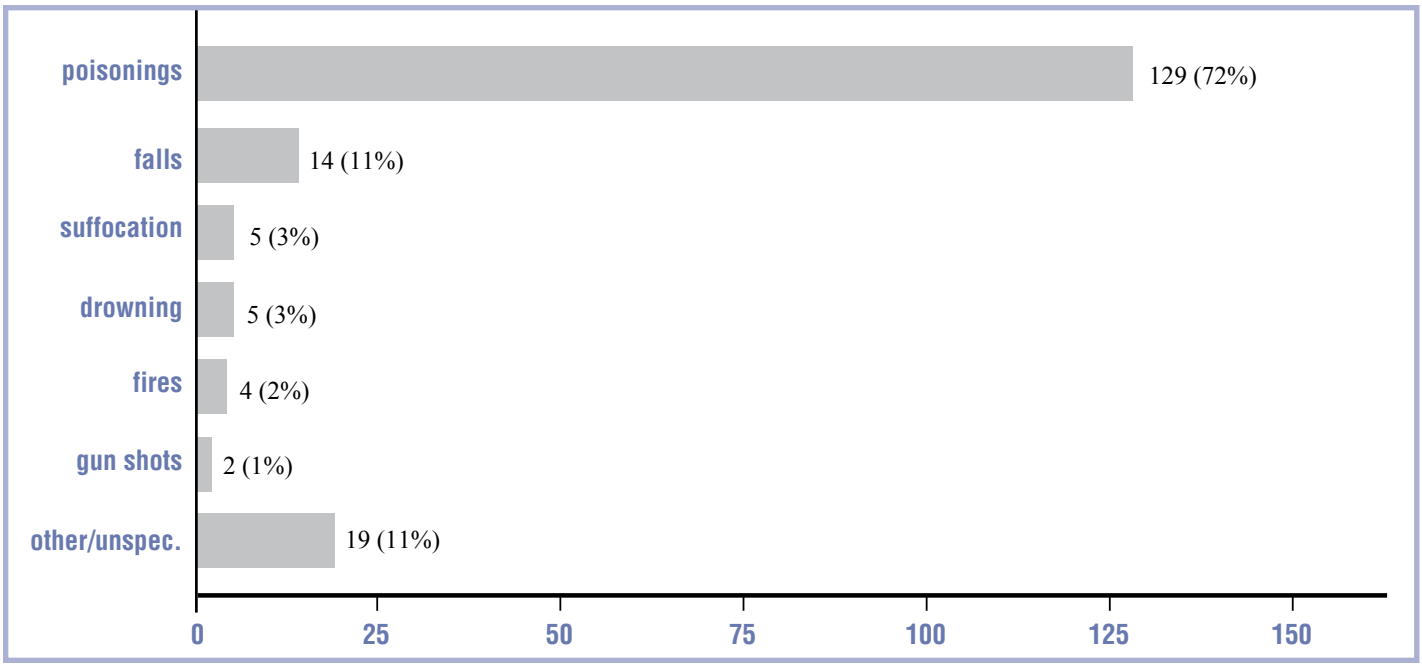


Figure 120 shows that most (72%) of these fatal injuries were due to poisonings, specifically poisonings due to medicinal substances (65%, or 115 of the fatalities). Most (81%, or 105) of the 129 poisonings were among 35 to 64 year-olds, similar to the age distribution of unintentional poisonings (see Figure 88). The 14 victims of fatal falls included 4 infants; the remaining victims were 20 to 52 years of age. The other 4 infant victims all died from suffocations. All 5 of the drowning victims were 23 years of age or older. The "other/unspec." category included 1 death due to cutting injury, and 1 from exposure to cold; no further information was available on the cause of the other 17 deaths.

Figure 120. Fatal injuries of undetermined intent among residents of Hawai'i, by injury category, 1996-2000.

(Number in parentheses is the percent of all such injury deaths.)



Fatal injuries among non-residents:

Up to this point, this report has included only information on fatal injuries among Hawai‘i residents. However, a total of 317 non-residents also died of injuries in Hawai‘i over the 1996-2000 period. Although the lowest annual total of such deaths occurred in 1997, there was a steady increase in succeeding years (Figure 121). About half (49%, or 155) of the victims were killed on the island of O‘ahu, 19% (59) on Hawai‘i, 20% (62) in Maui County (55 on the island of Maui, the other 7 on Moloka‘i), and 13% (40) on Kaua‘i. The annual total trended upward on O‘ahu, but was fairly stable on Hawai‘i and Kaua‘i. There was a downward trend for Maui County, until a dramatic increase in 2000.

The 317 deaths resulted from 282 separate incidents, as 2 or more victims (49 in total) were killed in 14 incidents. (The annual number of incidents is given in parentheses in Figure 121.) The high death totals in 2000 for the state and Maui County are partly attributable to only 3 separate incidents on Maui: a plane crash (6 victims), a helicopter crash (6), and a motor vehicle crash (4). When the number of incidents is considered, the upward trend from 1997-2000 is less evident, although the 2000 total is still greater than those for 1997-1999.

Figure 121. Annual number of fatal injuries among non-residents in Hawai‘i, by county, 1996-2000.

(Annual number of incidents shown in parentheses.)

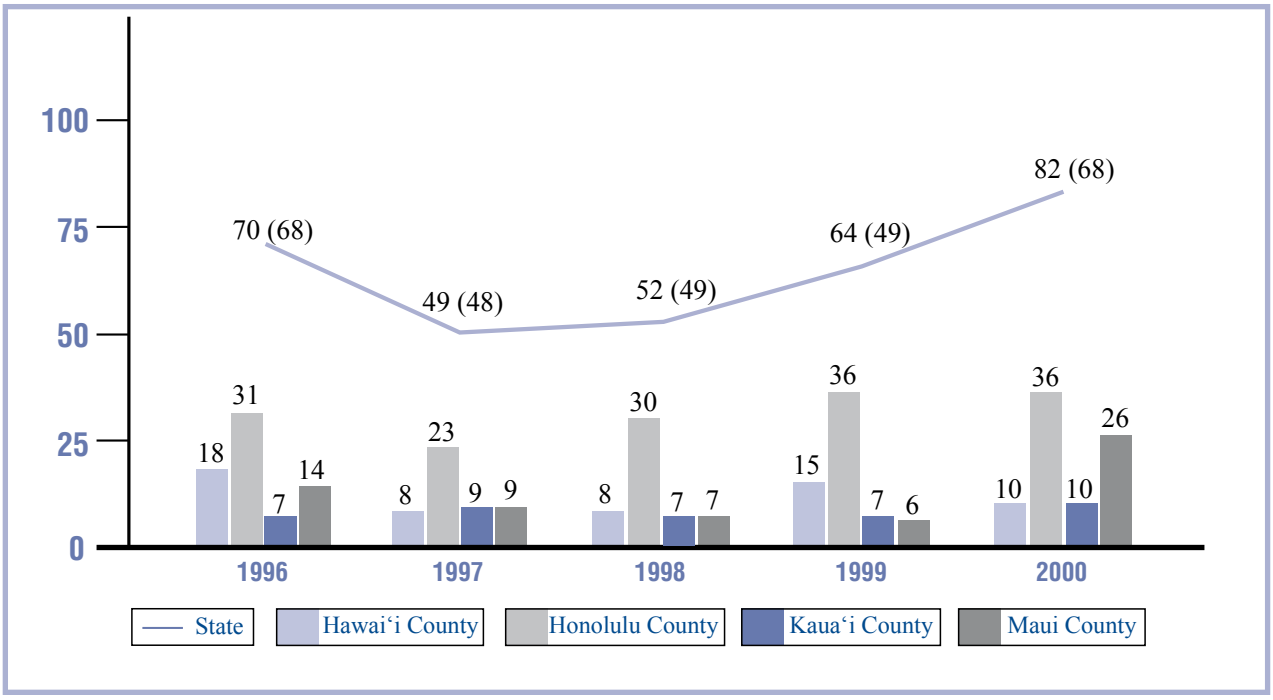
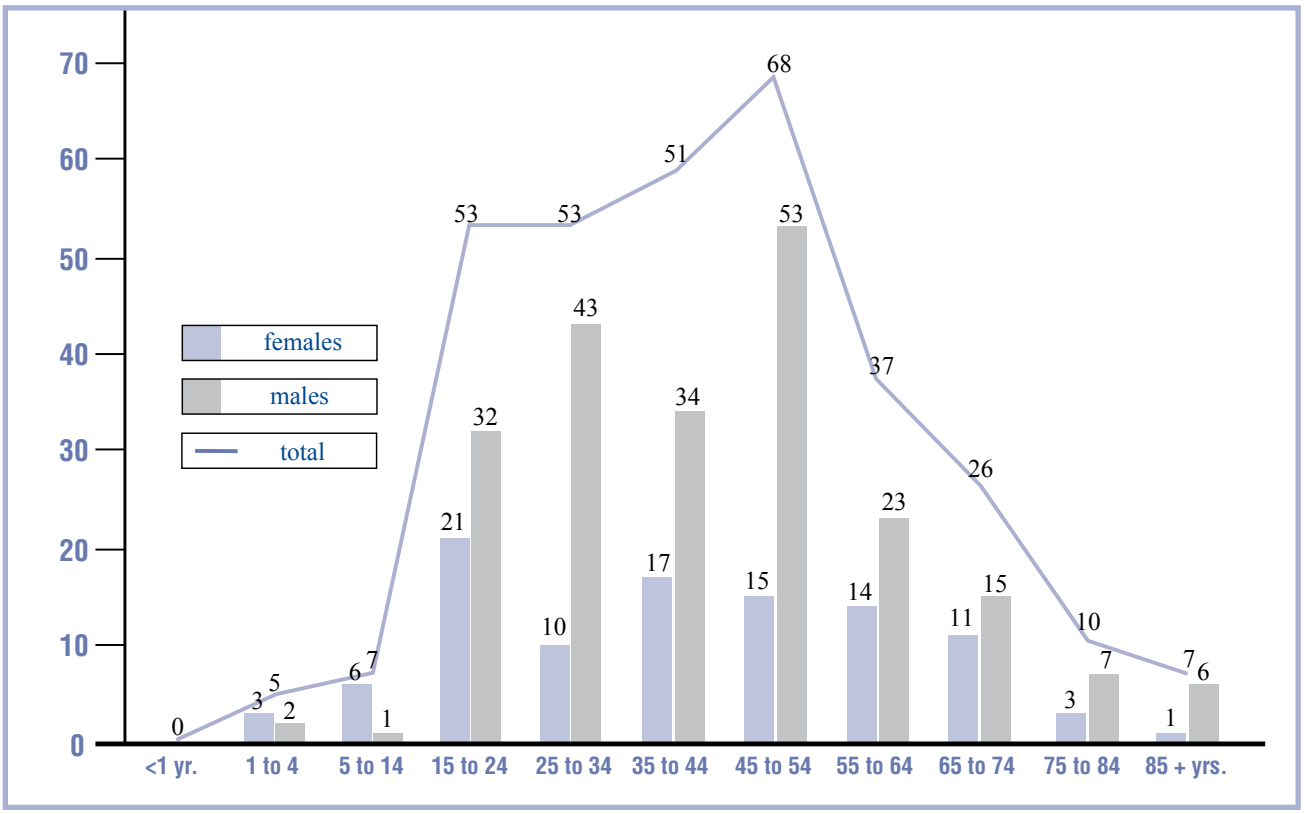


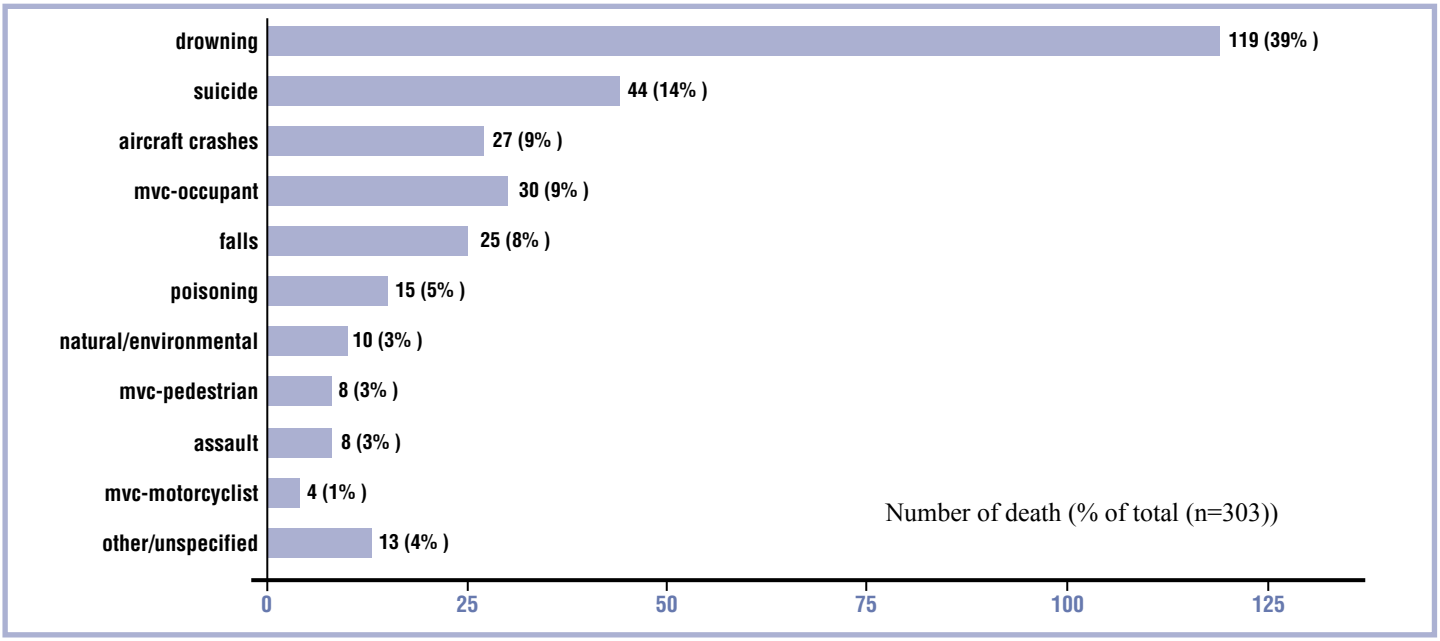
Figure 122 shows that fatal injuries occurred among non-resident victims of all ages. However, two-thirds (66%, or 208) of the victims were between the ages of 25 and 64 years. In general, the age distribution of the non-resident victims was similar to that among resident victims, except there were proportionally fewer older victims (ages 75 and older) in the former (5% vs. 20%, respectively). About two-thirds (68%, or 216) of the non-resident victims were males, similar to the proportion for resident victims of fatal injuries (72%).

Figure 122. Age and gender distribution of victims of fatal injuries among non-residents in Hawai‘i, 1996-2000.



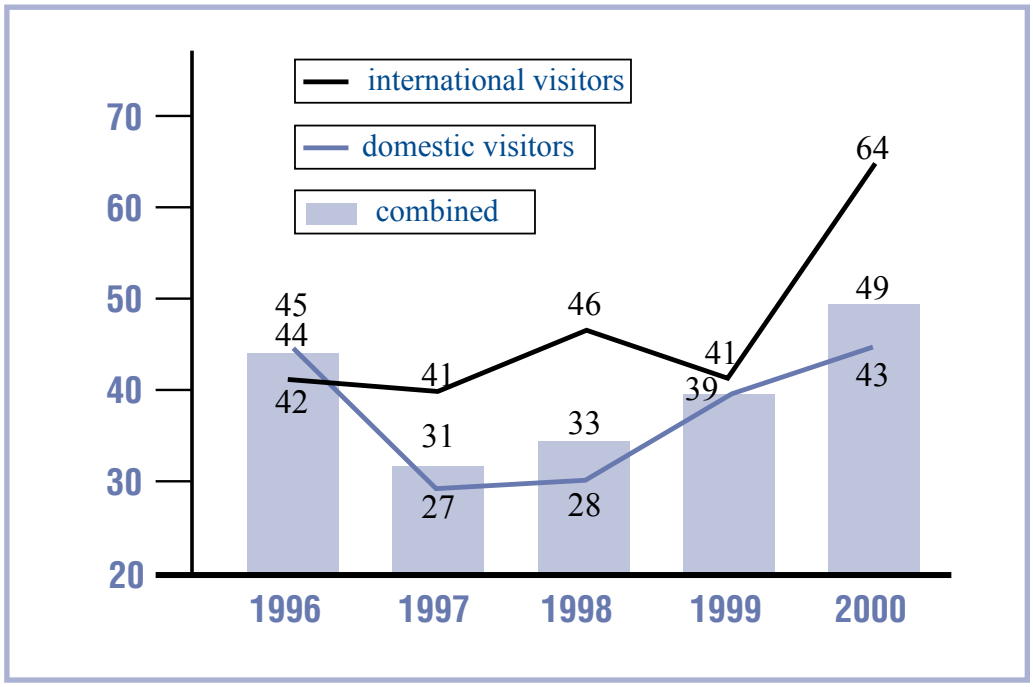
The causes of the 317 deaths are shown in Figure 123. Most (79%, or 251) of the deaths were due to unintentional injuries. (Not shown are the 14 non-residents killed by injuries of undetermined intent.) Drowning was the leading cause, accounting for 40% of the deaths. These deaths are discussed in more detail in the separate chapter on drownings. The second leading cause was suicide, which was more common among the international visitors (24 of 111, or 22%) than the domestic visitors (20 of 206, or 10%). The 27 deaths due to aircraft crashes resulted from 7 separate incidents, including 8 deaths from a plane crash on Mauna Loa on Hawai‘i in September of 1999, 6 deaths from a plane crash on Moloka‘i in May of 2000, and 6 deaths from a helicopter crash in ‘Īao Valley, Maui, in July of 2000. The "natural environmental" cause includes 7 victims who were killed by rockslides, including 6 in a single incident at Sacred Falls on O‘ahu, in May of 1999.

Figure 123. Fatal unintentional injuries among non-residents of Hawai‘i, by injury category, 1996-2000.



About two-thirds (65%, or 206) of the victims were visiting from the 49 States outside of Hawai‘i, and the remainder (35%, or 111) were residents of other countries. (No further breakdowns of residence were available from this data.) Visitor statistics compiled by DBEDT were used to compute fatal injury rates of non-residents. The 5-year crude mortality estimates were significantly lower among visitors from other States compared to visitors from foreign countries (181 vs. 233 deaths/100,000 visitor years). (Visitor years is the number of visitor days divided by 365.25.) Figure 124 shows that this difference was consistent over the 1997-2000 period, although rates had a more consistent upward trend among the domestic visitors. (The high rate for international visitors in 2000 is at least partly attributable to the 16 people killed in the 3 incidents in Maui mentioned previously; all were visitors from foreign countries.) When all non-residents are considered together (depicted by the bars in Figure 124), the annual injury death rate increased significantly from 1997 to 2000. However, this may have been due to only 5 incidents that occurred over the 1999-2000 period, in which 30 people were killed. (Three aircraft crashes, 1 car crash, and a rockslide at Sacred Falls.) There was an upward trend in the annual number of incidents over the 1997-2000 period, but this was not statistically significant. In summary, the rate of fatal injuries among non-residents increased significantly over the 1997-2000 period, especially among visitors from the other parts of the United States, but this may have been due to several large scale incidents.

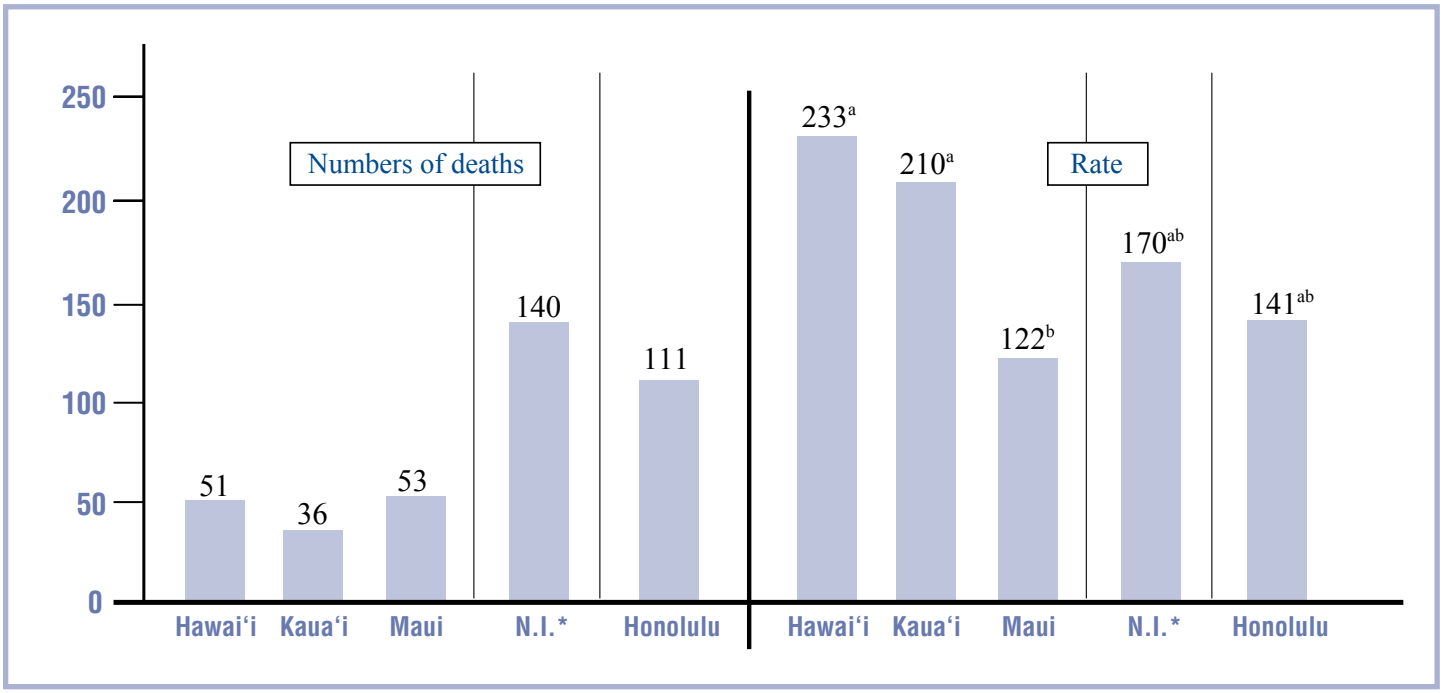
Figure 124. Annual rate of fatal injuries among non-residents in Hawai‘i, by nation of origin, 1996-2000.
(Rate is per 100,000 visitor years.)



Almost half (44%, or 111) of the 251 unintentional injury deaths among non-residents occurred on O‘ahu, but Figure 125 shows that the rate there was lower than for visitors to the islands of Hawai‘i and Kaua‘i. The lowest rate was computed for visitors to Maui County, which was significantly lower than the rates for visitors to Hawai‘i and Kaua‘i islands.

Figure 125. Number and rate of fatal unintentional injuries among non-residents of Hawai‘i, by county of injury, 1996-2000.

(Rate is per 100,000 visitor years.)



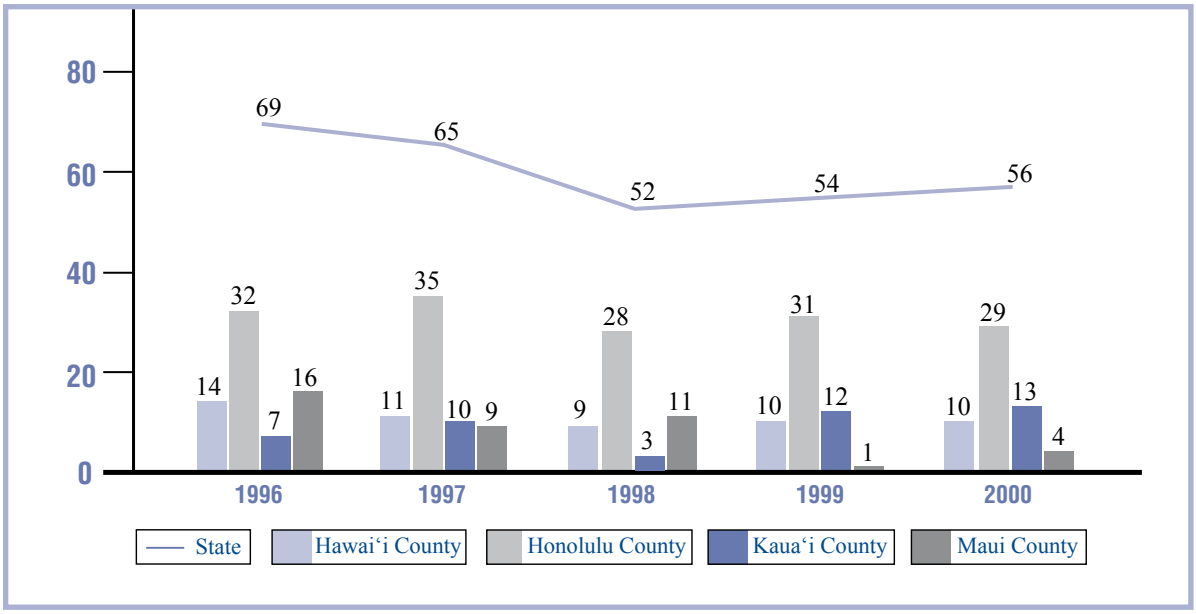
**N.I. = Neighbor Islands (combined totals for Hawai‘i, Kaua‘i, and Maui counties.)*
Counties with the same letter do not have statistically significant differences in rate estimates.

Almost half (44%, or 111) of the 251 unintentional injury deaths among non-residents occurred on O‘ahu, but Figure 125 shows that the rate there was lower than for visitors to the islands of Hawai‘i and Kaua‘i. The lowest rate was computed for visitors to Maui County.

Drownings (residents and non-residents)

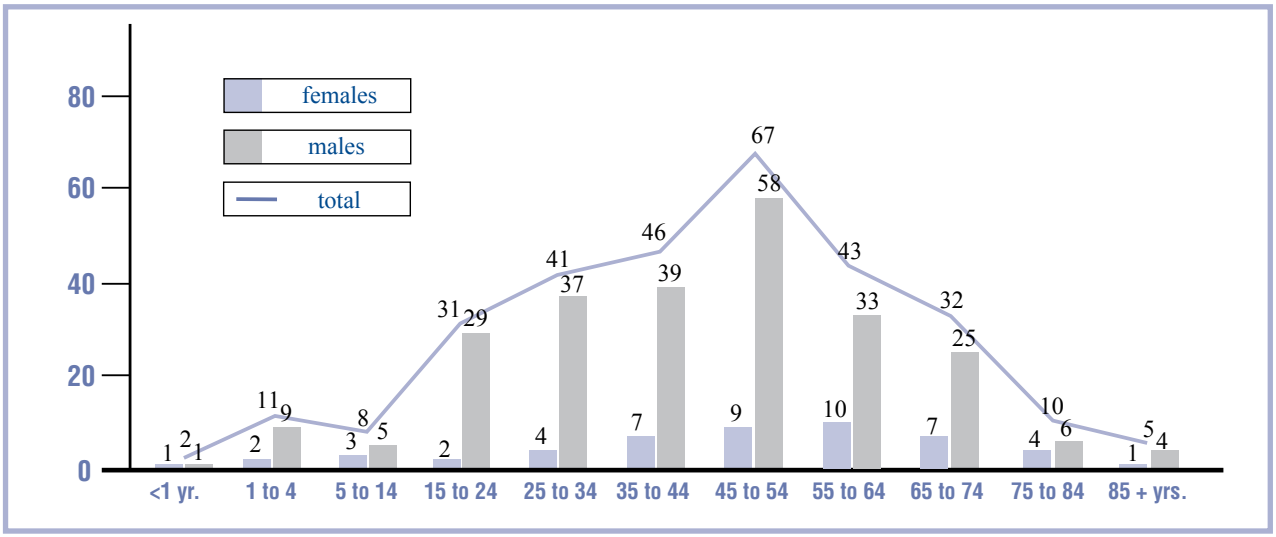
The previous chapter on drownings included only information on victims who were residents of Hawai‘i; this chapter also incorporates information from drownings among non-residents. There were 296 drownings over the 5-year period, including 119 victims (40%) who were not residents of the state. There was some suggestion of a declining trend over that time (Figure 126). The highest annual totals occurred in 1996 and 1997, then decreased to the 52 to 56 range for the 1998-2000 period. About half (53%, or 156) of the drownings occurred on O‘ahu, with the rest being roughly equally divided among Hawai‘i (18%, or 54 drownings), Kaua‘i (15%, or 45 drownings), and Maui Counties (14%, or 41 drownings). All but 5 of the 41 drownings in Maui County occurred on the island of Maui; there were 4 on Moloka‘i, and 1 on Lāna‘i.

Figure 126. Annual number of drownings (including non-residents) in Hawai‘i, by county, 1996-2000.



Drownings occurred among victims of all ages, with a large peak of victims in the 25 to 64 year age range (67%, or 197 of the victims) (Figure 127). There were also noticeable peaks among the very young (10 victims were 1 year-olds or younger) and old (9 victims were 84 to 86 years of age) age ranges. Only 50 of the victims (17%) were females; males outnumbered females by nearly a 5-to-1 ratio. That gender ratio was closer among the very young and very old victims.

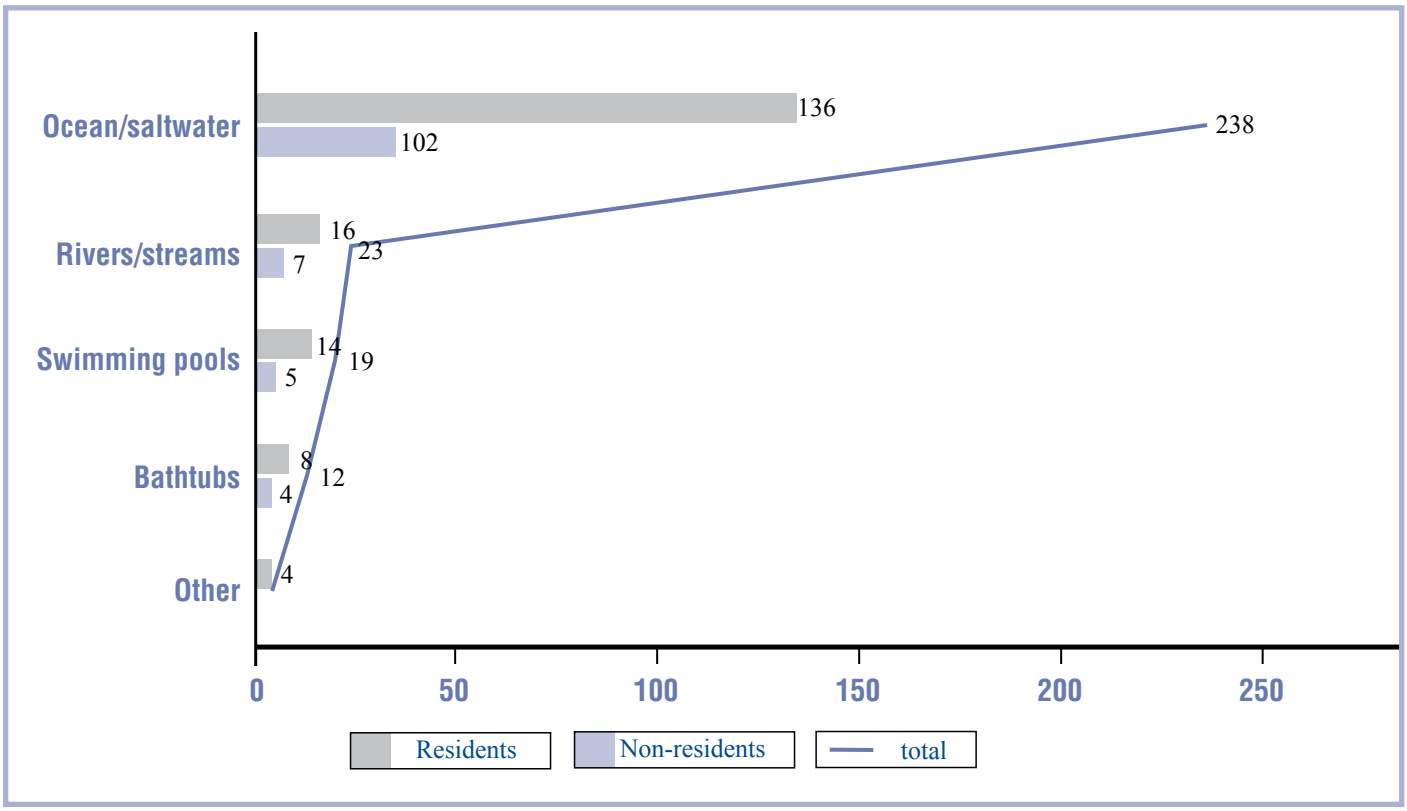
Figure 127. Age and gender distribution of drowning victims (including non-residents) in Hawai‘i, 1996-2000.



Overall, about 80% (238) of the drownings occurred in the ocean or other saltwater environments (Figure 128), although that proportion was slightly higher for non-resident victims (86%), compared to residents (77%). Drownings in rivers and other freshwater bodies (8%, or 23) and swimming pools (6%, or 19) made up most of the remaining drownings. There were also 12 victims who drowned in bathtubs and 4 in "other" environments.

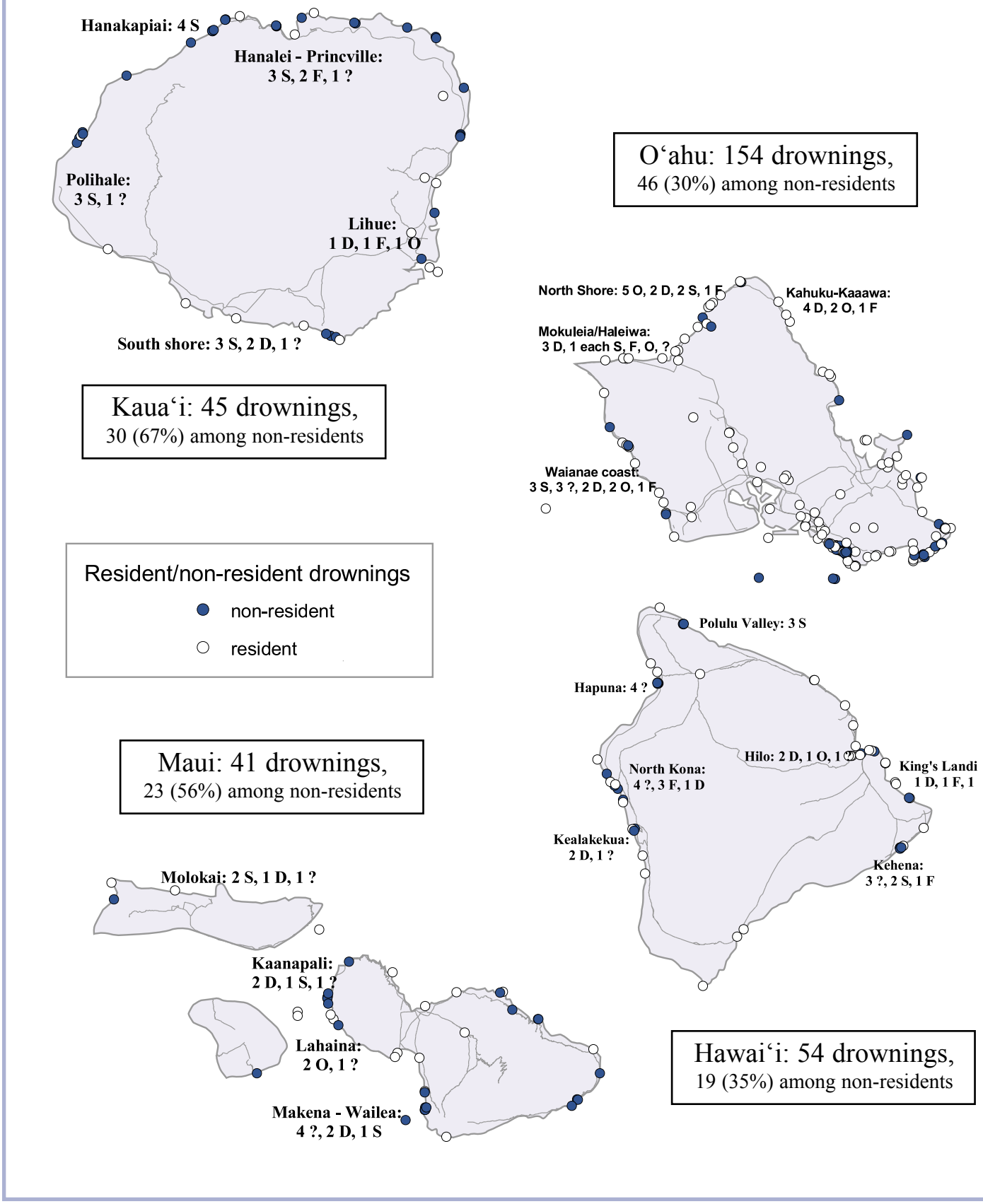
Almost half (47%, or 9) of the 19 victims who drowned in swimming pools were 5 years of age or younger, and all were residents of Hawai‘i. All but 2 of these drownings occurred on the island of O‘ahu. In contrast, freshwater drowning victims were mostly older children and adults; 20 (87%) were 15 years of age or older. The locations of the 16 drownings of residents were shown in Figure 77, in an earlier chapter. Five of the 7 non-resident victims drowned on the island of Maui, including 3 in the southeastern part of the island near ‘Ohe‘o Gulch. Only 1 of those 7 non-resident victims was known to have had an unintentional immersion; 3 were swimming at the time of the drowning (activity status unknown for the remaining 3 victims). Only 4 (2%) of the 238 victims who drowned in the ocean or saltwater environments were younger than 14 years of age. The ages of the remaining victims were widely distributed, with 93% (217) within the broad range of 20 to 74 years. The saltwater drownings will be discussed in more detail, in particular the events that were linked to records of the ME of Honolulu County.Figure 128. Drownings in Hawai‘i, by environment and residency, 1996-2000.

Figure 128. Drownings in Hawai‘i, by environment and residency, 1996-2000.



About two-thirds (30, or 67%) of the 45 drownings on the island of Kaua‘i were of non-residents. Figure 129 shows that while drownings occurred all around the island, almost one-third (13, or 29%) were along the Nā Pali coast, including 4 at Hanakāpī‘ai Beach, and 5 at Polihale Beach. Only 2 of those 13 victims were residents. Since only 30% of the 154 drownings on O‘ahu were among non-residents, the geographic pattern is largely as summarized in Figure 82: high numbers in metropolitan Honolulu, east O‘ahu, and the North Shore. About one-third (14) of the 46 non-resident victims drowned off the coastal stretch from Ala Moana Beach Park to Kaimana Beach. Another 10 drowned off the eastern tip of the island from Portlock to Makapu‘u, including 5 in Hanauma Bay. More than half (56%) of the victims in Maui County were non-residents. There were 5 saltwater drownings among non-residents in both the Mākena and Kā‘anapali areas of the island of Maui. Non-residents comprised only about 35% of the victims who drowned on the island of Hawai‘i. In addition to the general areas of Hilo and the Kona Coast, there were several areas where 3 non-residents drowned in the ocean: Hāpuna Beach, Pololū Valley, and Kehena Beach in the Puna district.

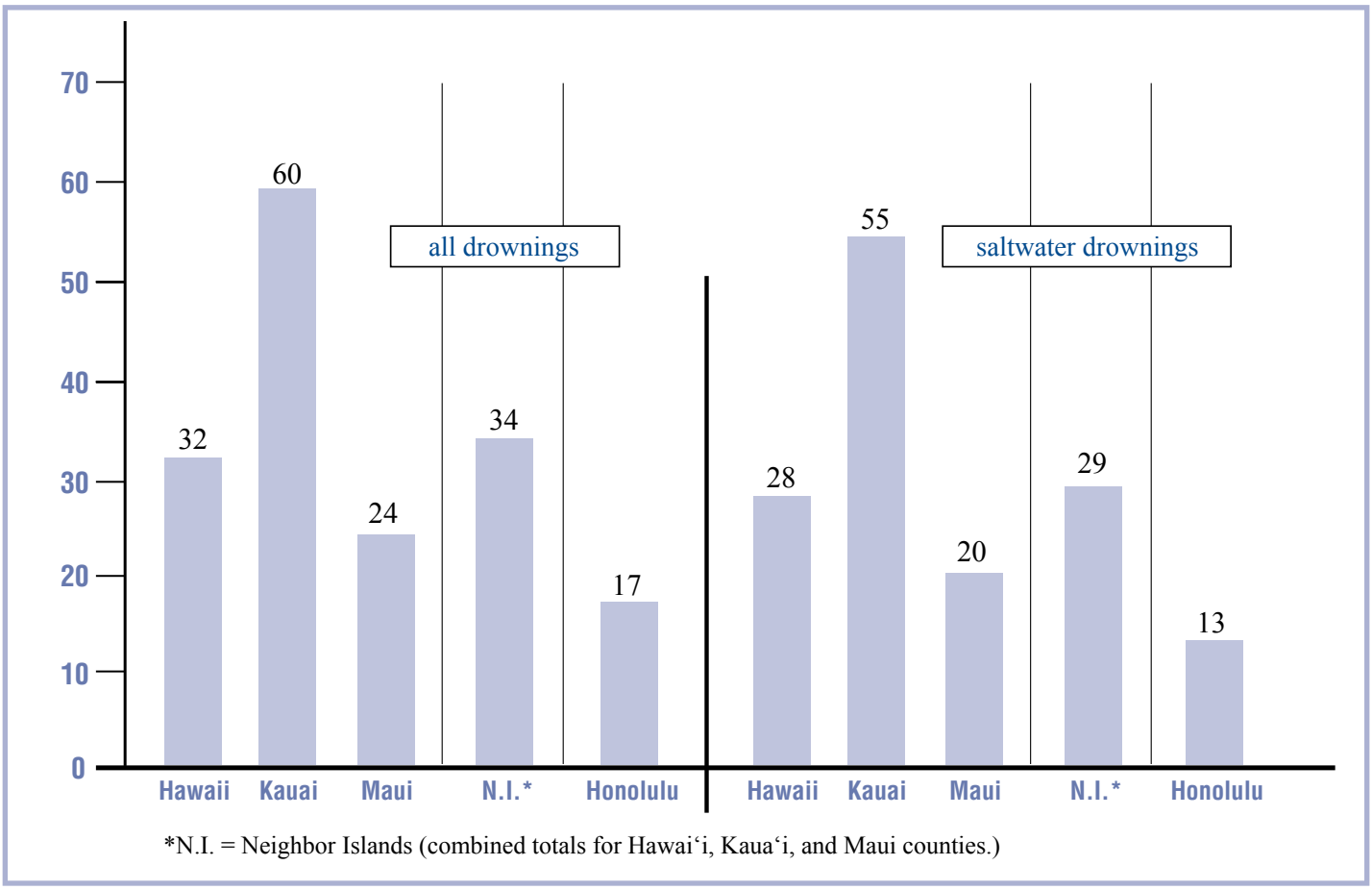
Figure 129. Drownings in Hawai‘i, by county and residence status of victims, 1996-2000.



Drowning rates were lowest for Honolulu County, for all drownings as well as for those that occurred in saltwater environments (Figure 130). The highest rates were computed for Kauaʻi, nearly 4 times the rate of drowning in Honolulu County and approximately double the rates computed for Hawaiʻi and Maui counties. Kauaʻi also had the highest rates for residents only (Figure 75), but the difference is augmented here, due to the high proportion of non-residents who drown on that island. If all the Neighbor Islands are considered together, the rates of drownings (both total and saltwater) are at least double the rates for Honolulu County.

Figure 130. Rate for all types of drownings (right side) and for saltwater drownings (left side) in Hawaiʻi, by county of injury, 1996-2000.

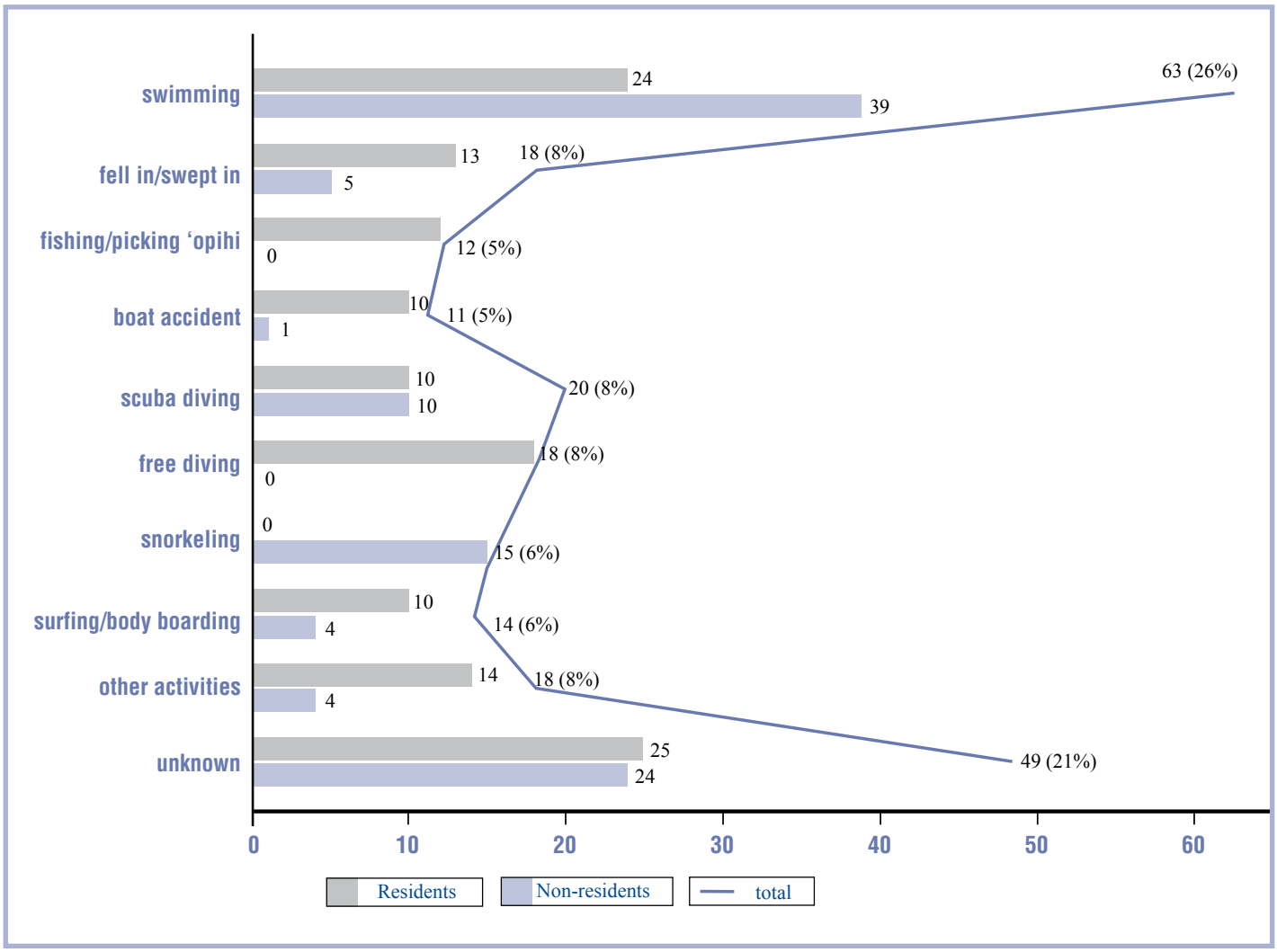
(Rate is per 100,000 de facto population, as estimated in 2000. Crude rate, unadjusted for age distribution.)



*N.I. = Neighbor Islands (combined totals for Hawaiʻi, Kauaʻi, and Maui counties.)

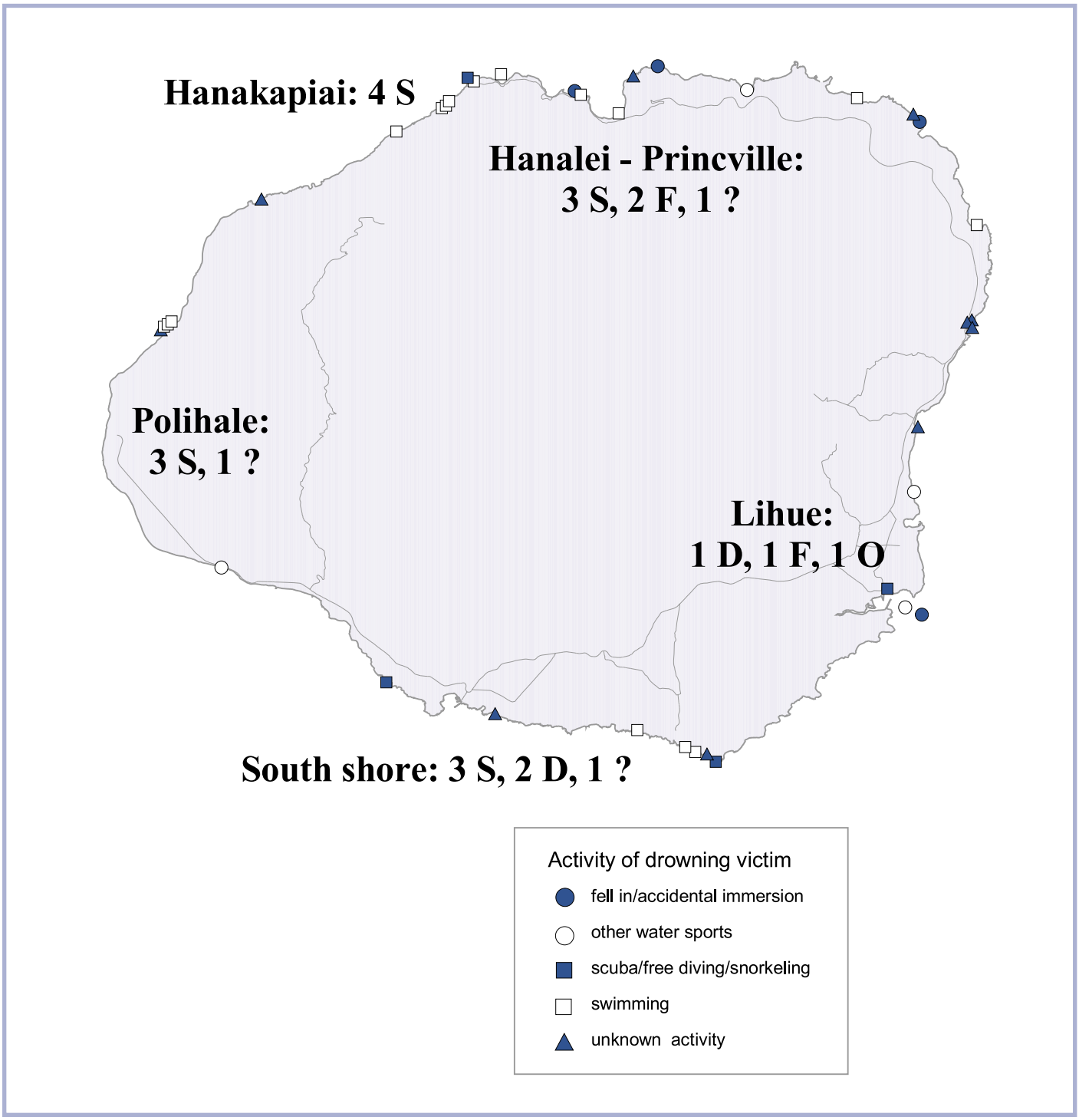
The most common activity among the 238 victims of saltwater drownings was swimming, accounting for approximately one quarter (63, or 26%) of the total (Figure 131). Almost two-thirds of these victims (62%, or 39) were non-residents. There were 41 drownings resulting from unintentional immersions including people who fell in or were swept in, fishing or gathering from shore, or who drowned after boat accidents. Nearly all of those (85%, or 35) were among residents. The 20 deaths of scuba divers were equally divided between residents and non-residents. All of the 18 victims who drowned while free diving were residents, while all of the 15 snorkelers were non-residents. Most (24, or 75%) of the victims who were surfing, body boarding or engaged in other water sports were residents. There was a large group of victims (49, or 21%) whose activity at the time of drowning was not documented.

Figure 131. Ocean drownings in Hawai'i, by activity and residency of victim, 1996-2000



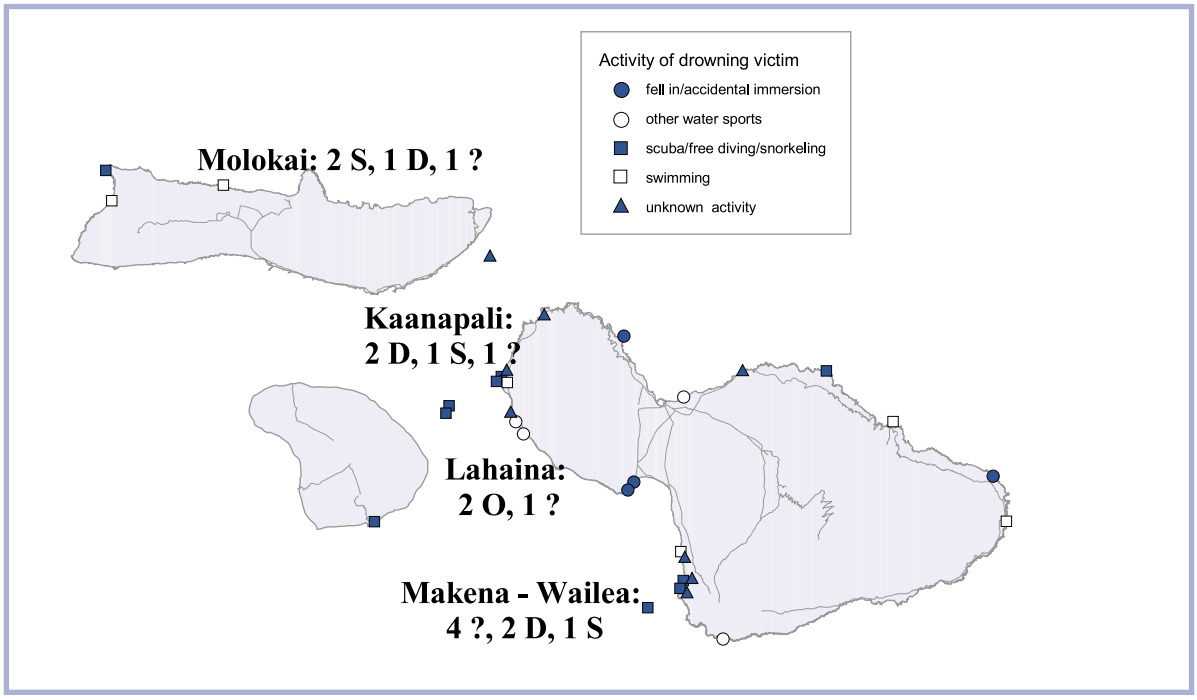
Almost all (10) of the 13 victims who drowned along the Nā Pali Coast of Kaua‘i were swimming, including the 4 who drowned at Hanakāpī‘ai and 3 at Polihale beach (Figure 132). (One victim was snorkeling, and the activity status for the other 2 was not known.) There were 3 to 4 drownings each year along Nā Pali, except for 1998, in which there were none. Swimming was generally less common of an activity among the remaining 28 victims of saltwater drownings on Kaua‘i.

Figure 132. Locations of drownings on Kaua‘i, by activity of victim, 1996-2000.



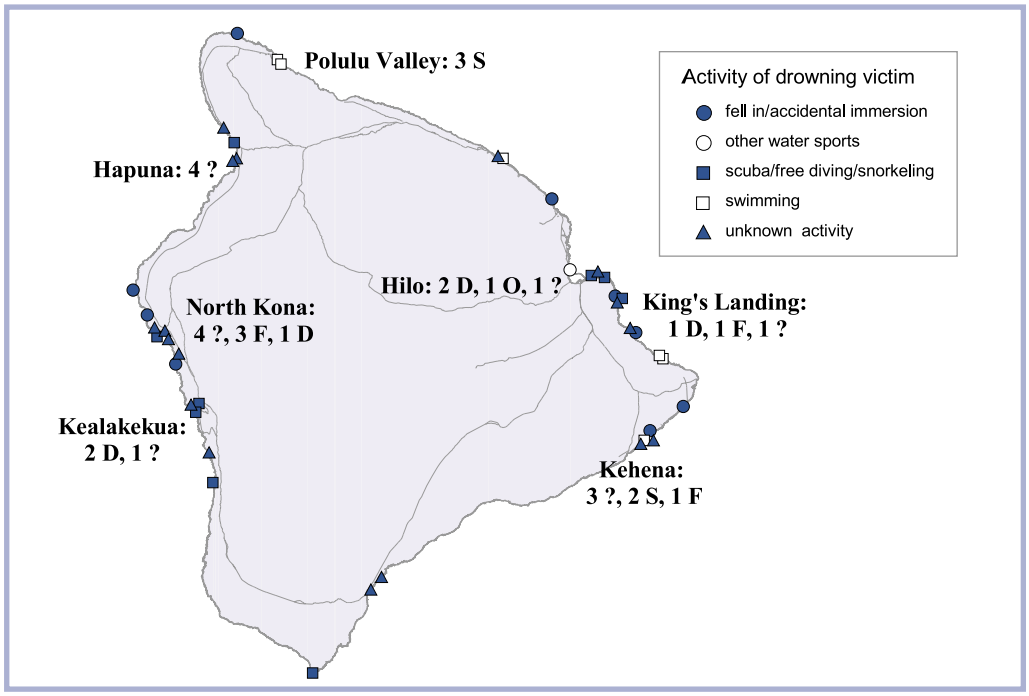
Only 5 (18%) of the 28 saltwater drownings on the island of Maui were among victims who had been swimming (Figure 133). There were more victims (8) who had been diving, including 3 who were scuba diving off the west coast of the island, and 4 who were snorkeling.

Figure 133. Locations of drownings in Maui County, by activity of victim, 1996-2000.



Unfortunately, the activity was not known for 40% (19) of the 47 victims of saltwater drownings on the island of Hawai'i, the highest such proportion in any county (Figure 134). There were 10 victims who had unintentional immersions into water, 9 who were diving (4 free diving, 3 snorkeling, and 2 scuba diving), and 8 others who had been swimming. The drownings due to unintentional immersions or diving were widely dispersed around the island.

Figure 134. Locations of drownings in Hawai'i County, by activity of victim, 1996-2000.



Swimming (29 victims) was the single most common activity among the 116 saltwater drowning victims on O‘ahu, but most of these incidents occurred in the Honolulu area (14 drownings) or on the eastern side of the island (6) (Figure 135). Relatively few of the drownings outside of the Honolulu area were related to swimming. Half (5) of the 10 drownings which involved surfing or body boarding occurred along the North Shore. (These incidents are denoted by the "O" for "other water sports".)

Figure 135. Locations of drownings on O‘ahu, by activity of victim, 1996-2000.

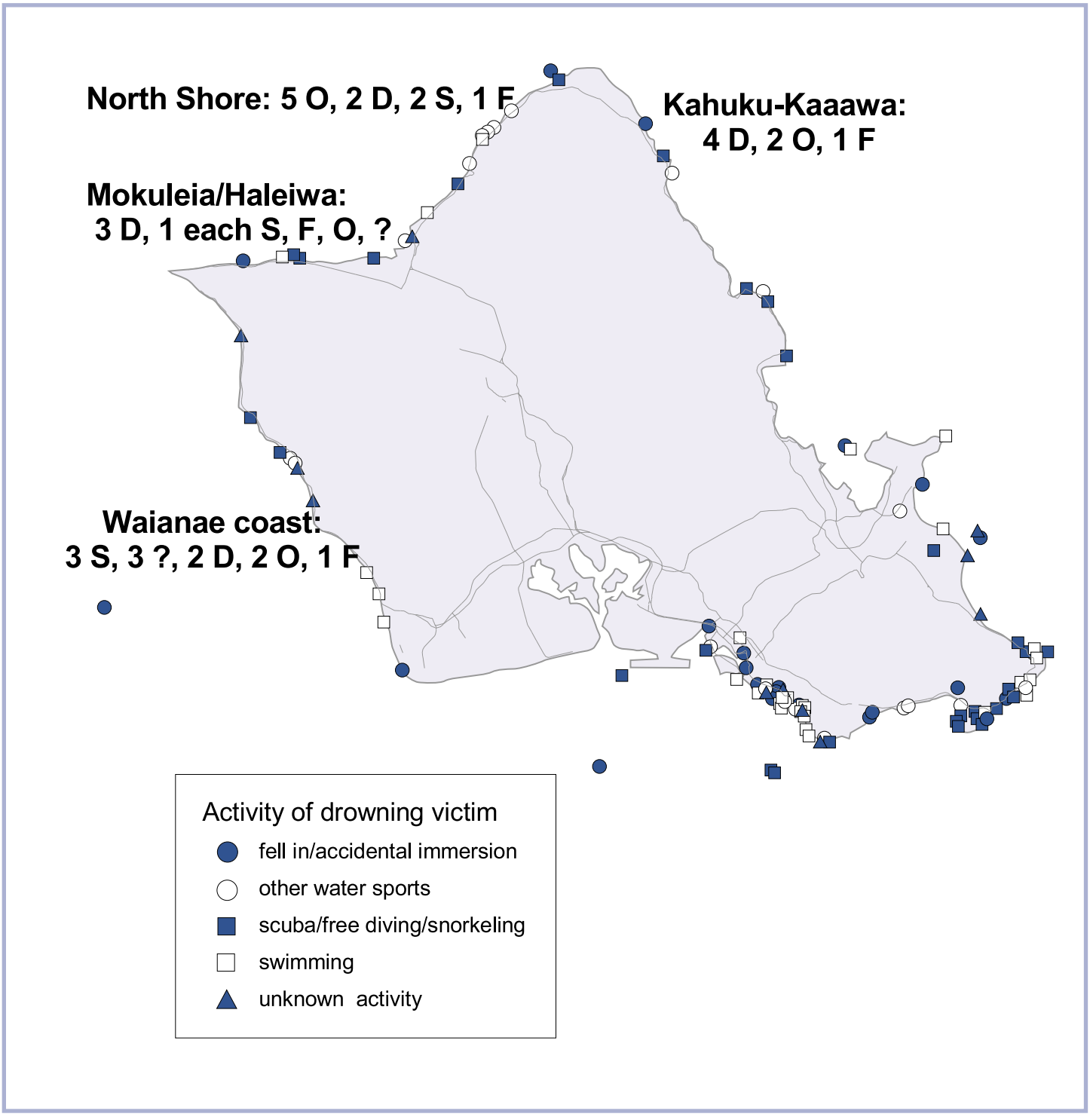
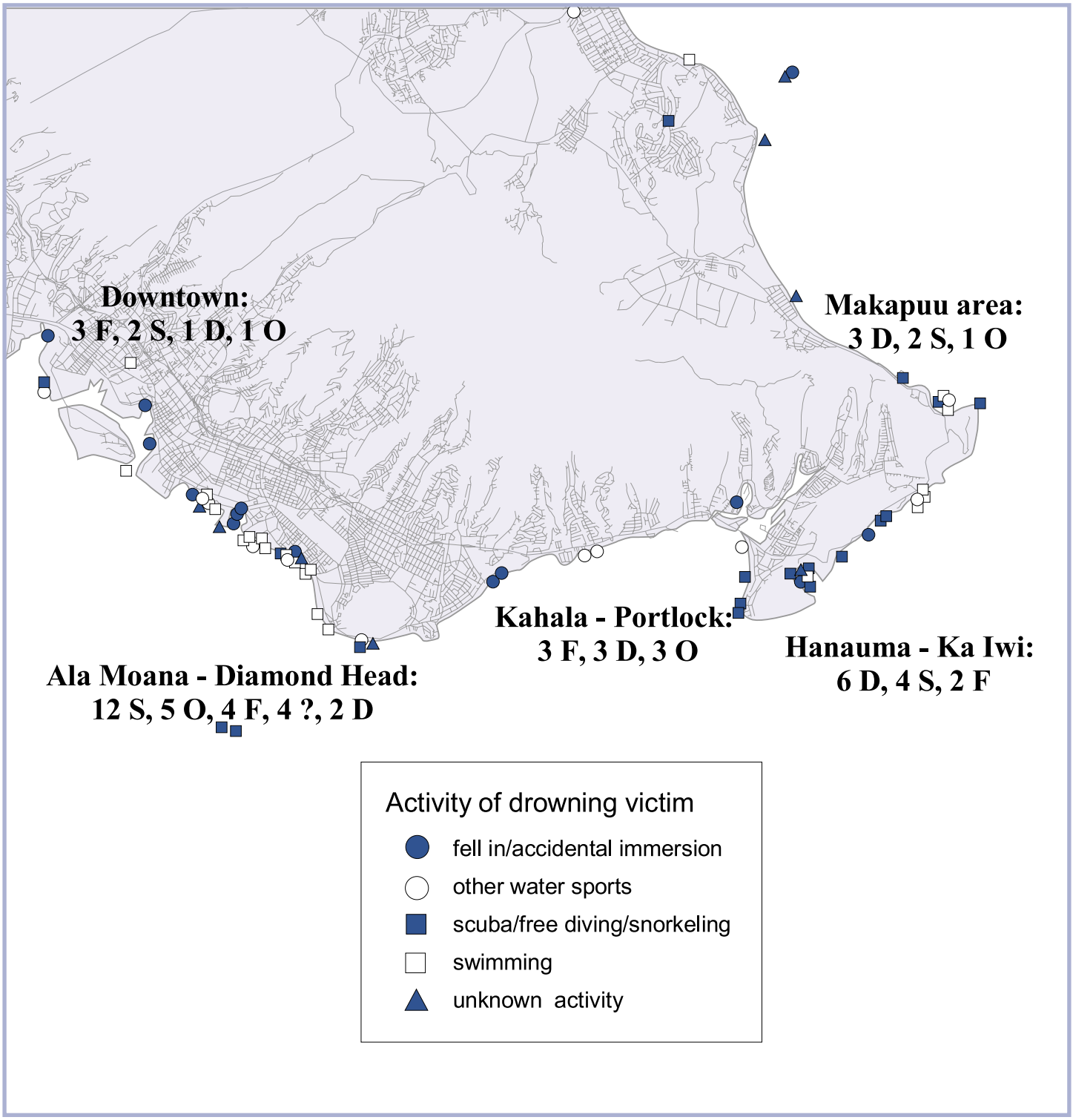


Figure 136 below shows the saltwater drownings in the Honolulu-to-east O‘ahu section in more detail.

Figure 136. Locations of drownings on eastern O‘ahu, by activity of victim, 1996-2000.



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